Chapter 6: Replacement Instructions

6.1 Repair Information

WARNING: BiPAP 30 is a Class II critical care medical device. All repairs must be accomplished in a manner that maintains traceability of the components assembled in each unit. All replacement parts must be identified by Part Number and Lot Number, and a record of the repair must be forwarded to Respironics at the following address:

1001 Murry Ridge Drive
Murrysville, PA, U.S.A. 15668-8550
Main Office: 412/733-0200 • Toll Free: 800-638-8208 • Fax: 412/733-0299

WARNING: Adjust the unit as outlined Chapter 7 if any repairs are made that replace major subassemblies (such as the blower, valve, circuit boards) or which affect the air stream integrity (such as the muffler or flow tubes).

WARNING: Electrical shock hazard. Disconnect the electrical supply before making repairs to the BiPAP 30 unit.

CAUTION: Electronic components used in this unit are subject to damage by static electricity. Use proper static discharge and grounding precautions when servicing the equipment. Service only at a static-free workstation.

NOTE: Use Loctite® small screw thread locker 222 (Purple Dot) for small screws where designated.

6.2 Replacement Instructions

6.2.1 Preparing the Unit for Service

Tools Required:

Phillips screwdriver

Refer to Figures: 6-1 to 6-4

Removing the Wraparound and Top Plate

Step 1 Make sure that your work area is clean and static-free.

Step 2 Remove the patient circuit, if necessary, from the unit. Disconnect any auxiliary equipment, such as the DCP or proximal pressure line (S/T-D 30 units only).

Step 3 Unplug the unit from the wall outlet and disconnect the electrical plug from the back of the unit.

Step 4 Place the unit on the rear end cap and remove the six bumper feet (A) with the screwdriver.

CAUTION: The six bumper feet that secure the wraparound to the unit also secure the bottom plate containing the MCB. When the wraparound is removed, secure the bottom plate to prevent damage to the MCB wires.

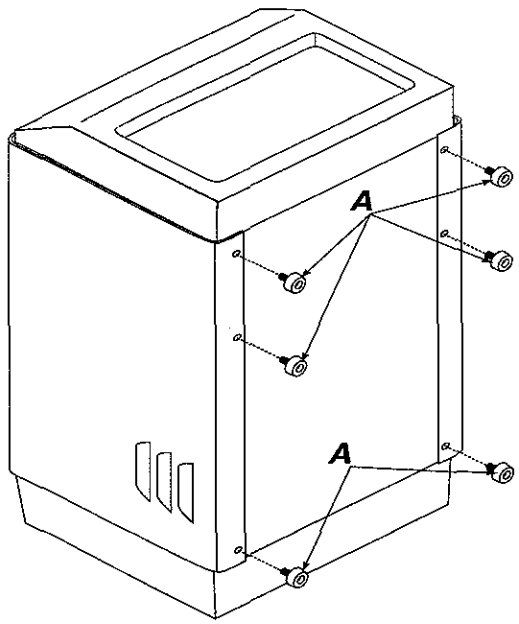


Figure 6-1

Step 5 Slide the wraparound (B) toward the front of the BiPAP unit.

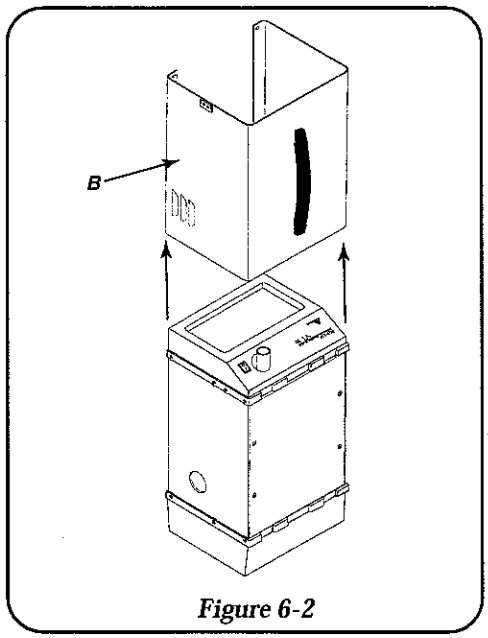


Figure 6-2

Step 6 Use the screwdriver to remove the four screws (C) that secure the top plate to the top of the BiPAP 30 unit.

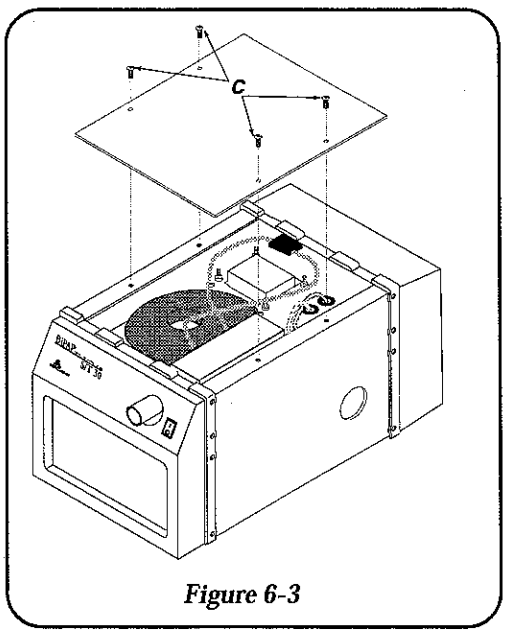


Figure 6-3

Releasing Hose Clamps

Figure 6-4 shows how to release the hose clamps that hold the bellows and flex connector to their respective ports. Insert a slotted screwdriver where indicated and twist to release the ratchets; pull the hose clamp apart. Normally, the replacement kit contains new hose clamps if the old ones are removed.

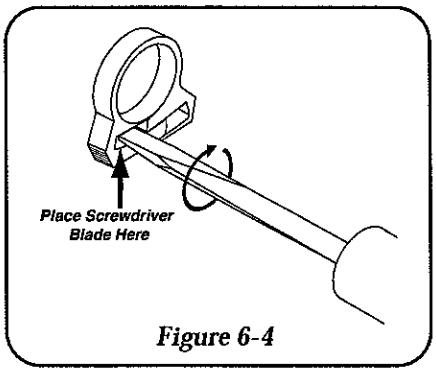


Figure 6-4

6.2.2 Replacing the BiPAP 30 Wraparound

Replacement Part Number: 552065

Included in Kit:	Tools Required:
1 BiPAP 30 Wraparound subassembly 6 Screw-on bumper feet	Phillips screwdriver Torque screwdriver capable of 4 in-lb

Procedure

CAUTION: Electronic components used in this unit are subject to damage by static electricity. Use proper static discharge and grounding precautions when servicing the equipment. Service only at a static-free workstation.

Step 1 Remove the old wraparound as described in 6.2.1. You do not need to remove the top plate.

Step 2 Install the new wraparound and insert the six bumper feet into the bottom of the unit. Tighten to 4 in-lb.

6.2.3 Replacing the BiPAP 30 Flow Pickup Tubes

Replacement Part Number: 552085

Included in Kit:	Tools Required:
2 BiPAP 30 Flow pickup tubes, 11 1/2" 2 ET-3 Wire ties	Side cutters Phillips screwdriver Torque screwdriver capable of 4 in-lb

Refer to Figure: 6-5

Removing the Flow Pickup Tubes

Step 1 Remove the wraparound and top plate as described in 6.2.1.

Step 2 Label the flow tube connection points (A and B) so that the new flow pickup tubes are routed the same.

Step 3 Remove the flow pickup tubes (C) from the unit.

Replacing the Flow Pickup Tubes

Step 1 Push the new pickup tubes onto the proper connectors. Place wire ties over the flow transducer connections and tighten.

Step 2 Replace the bottom panel, the top panel, and the wraparound.

Step 3 Perform the system adjustment as described in Chapter 7.

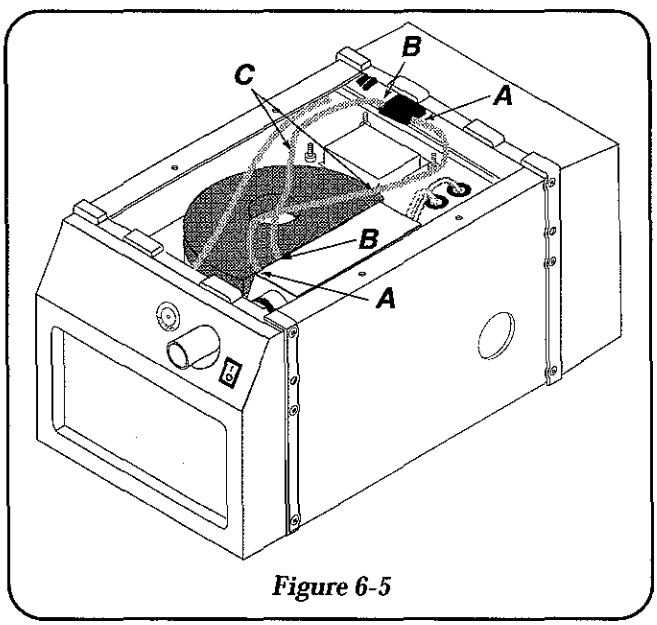


Figure 6-5

6.2.4 Replacing the BiPAP S/T-D 30 or S/T 30 Front End Cap

Replacement Part Number: 552067 (S/T-D 30) or 552068 (S/T 30)

Included in Kit:	Tools Required:
1 Front End Cap 4 Latch Type Fasteners, 6-32 2 Hose Clamps	Phillips screwdriver Torque screwdriver capable of 4 in-lb Needle nose pliers Cutting pliers

Refer to Figures: 6-6 to 6-9

Removing the Front End Cap

Step 1 Remove the wraparound and top plate as described in 6.2.1.

CAUTION: Electronic components used in this unit are subject to damage by static electricity. Use proper static discharge and grounding precautions when servicing the equipment. Service only at a static-free workstation.

NOTE: Be sure to note the position and orientation of each connector on the Motor Control Board.

Step 2 Turn the unit upside-down and remove the bottom plate by disconnecting the three electronic connectors and the ground wire on the Motor Control Board.

Step 3 Release the hose clamp (A) on the blower inlet and remove the air inlet bellows from the inlet.

Step 4 Turn the unit right-side up.

Step 5 **S/T-D only:** With cutting pliers, snip the hose wire tie that secures the pressure transducer tubing (B) to the pressure port on the front end cap (C). Slide the tubing off of the port.

Step 6 Release the hose clamp (D) on the blower outlet and remove the flexible tubing from the outlet.

NOTE: Be sure to note the position of the power switch wires before you remove them.

Step 7 Remove the four wires (E) from the rear of the power switch. Remove the power switch (F) by carefully prying the switch out from the front of the BiPAP unit.

Step 8 Remove the three pan-head Phillip screws (G) from each side of the front end cap.

Step 9 Verify that all interconnections between the front end cap and the chassis have been disconnected.

Step 10 Slide the front end cap away from the chassis.

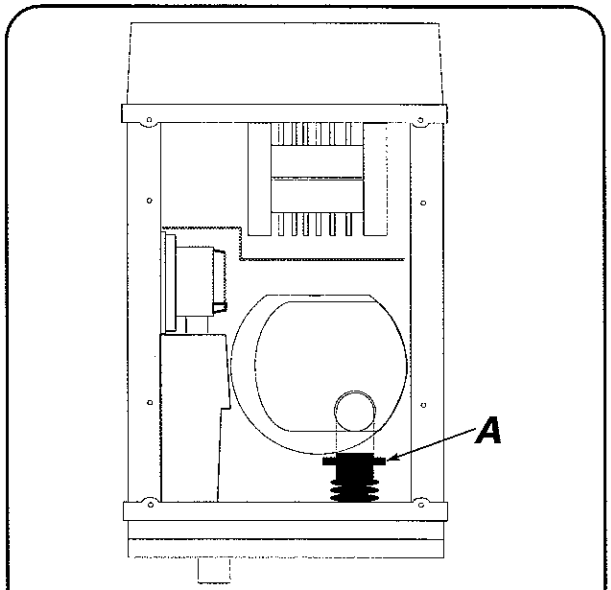


Figure 6-6

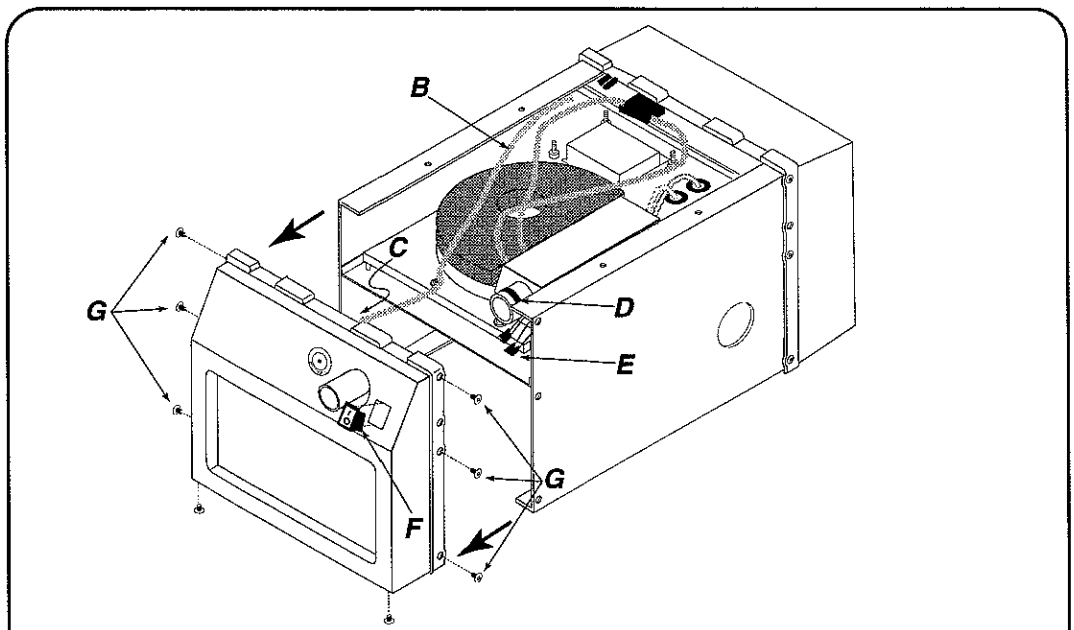


Figure 6-7

Replacing the Front End Cap

Step 1 Push the power switch into the new front end cap from the front. Verify that the switch is oriented with ON (I) at the top.

Step 2 Place the new front end cap into position. Place one hose clamp over the blower outlet and then slide the outlet flex tubing over the blower outlet. Place the hose clamp over the tubing near the end of the outlet and ratchet the hose clamp until it is tight.

Step 3 Attach the four power switch wires to the power switch. The wires should be positioned as shown in Figure 6-8.

Step 4 **S/T-D units only:** Slide the pressure transducer tube over the pressure port on the front end cap. Secure the tube with an ET-3 wire tie.

Step 5 Carefully turn the unit upside-down. Place a hose clamp over the air inlet and then slide the air inlet bellows over the inlet. Position the hose clamp over the bellows near the end of the inlet and ratchet the clamp until it is tight.

Step 6 Turn the unit right-side up; position the front end cap so that the six holes on the sides of the end cap align with the six holes in the BiPAP 30 chassis. Insert the six Phillip screws in the holes and tighten to 4 in-lb.

Step 7 Replace the electronic connectors and the ground wire on the MCB as shown in Figure 6-9.

Step 7 Replace the top panel, the bottom panel, and the wraparound.

Step 8 Perform the system adjustment as described in Chapter 7.

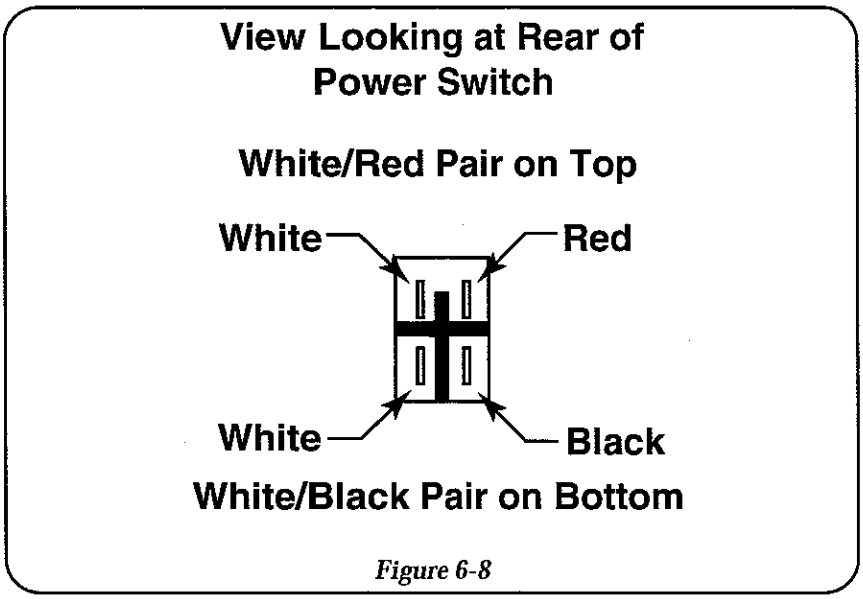


Figure 6-8

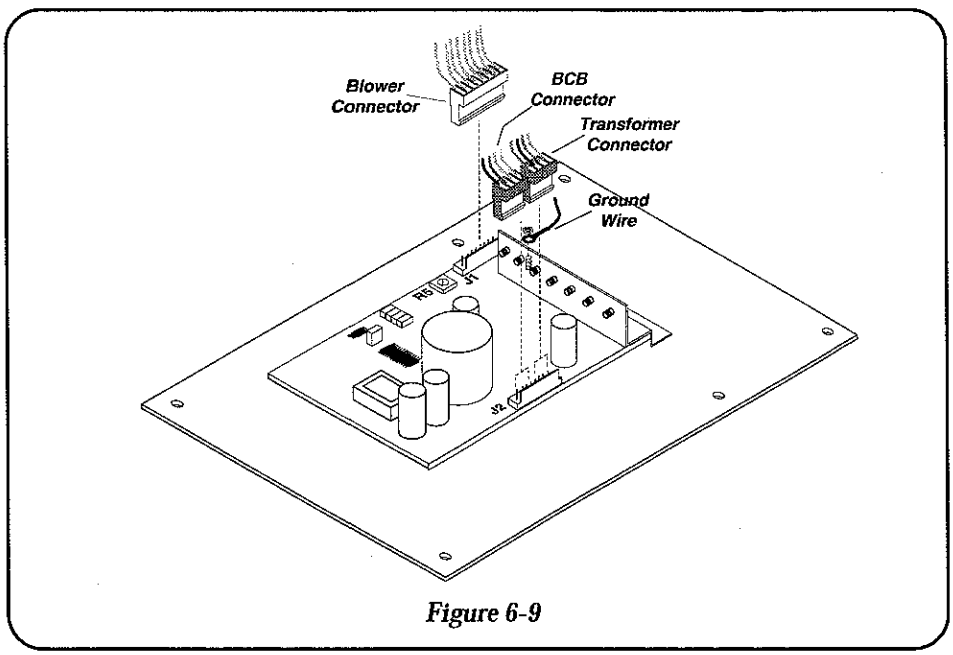


Figure 6-9

6.2.5 Replacing the BiPAP 30 Blower Module

Replacement Part Number: 552070

Included in Kit:	Tools Required:
1 BiPAP 30 Blower module subassembly 4 Tie wraps (ET-7) 1 Wire tie (ET-3)	Needle nose pliers Loctite 222 Angle wire cutters Phillips screwdriver Torque tool capable of 8 in-lb and 10 in-lb for Phillips screws and nuts ($^{11}/_{32}$")

Refer to Figures: 6-10 to 6-12

Removing the Blower Module

Step 1 Remove the wraparound and top plate as described in 6.2.1.

Step 2 Remove the three Phillip screws (A) from each side of the front end cap.

Step 3 Release the hose clamp (B) on the blower outlet and remove the flexible tubing from the outlet.

Step 4 **S/T-D units only:** Remove the pressure sensor tubing (C) from the pressure transducer (D) in the rear end cap.

NOTE: Be sure to note the position of the power switch wires before you remove them.

Step 5 Remove the four wires (E) from the rear of the power switch.

Step 6 Verify that all interconnections between the front end cap and the chassis have been disconnected.

Step 7 Label and then remove the two flow sensor tubes (F) from the blower.

CAUTION: Electronic components used in this unit are subject to damage by static electricity. Use proper static discharge and grounding precautions when servicing the equipment. Service only at a static-free workstation.

NOTE: Be sure to note the position and orientation of each connector on the Motor Control Board.

Step 8 Turn the unit upside-down and remove the bottom plate by disconnecting the three electronic connectors and the ground wire (remove the 4-40 nut) on the Motor Control Board.

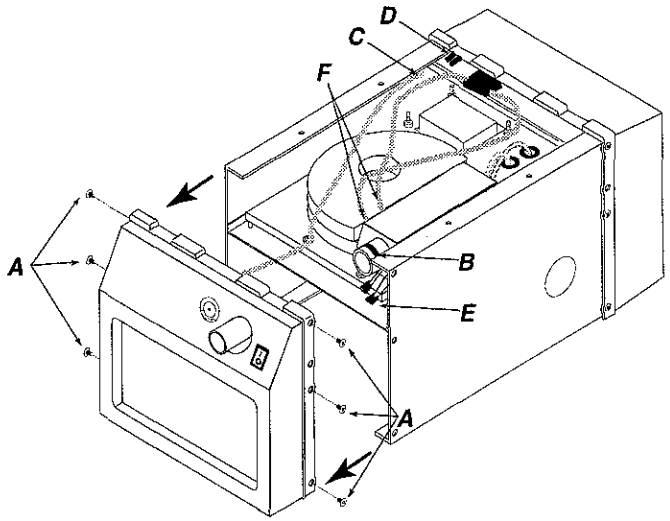


Figure 6-10

Step 9 Release the hose clamp (G) on the blower inlet and remove the air inlet bellows from the inlet.

Step 10 Slide the front end cap away from the chassis.

Step 11 Remove the side panel by removing the four valve screws (H), the three remaining end cap screws (I), and the three side panel retaining screws (J).

NOTE: For units with Serial Numbers >100742, cut the tie wrap from the valve to blower connection (L) only. The muffler to blower connection does not have a tie wrap. See the detail in Figure 6-11.

Step 12 Cut the tie wraps from the muffler to blower connection (K) and the valve to blower connection (L).

Step 13 Turn the unit right-side up.

Step 14 Open the cable clip at the rear of the blower and release the wires that were enclosed.

Step 15 Use the manual nut driver to remove the four $^{11}/_{32}$" nuts (M) that retain the blower on the four rubber shock mounts (N).

Step 16 Remove the blower assembly from the BiPAP 30 chassis.

Replacing the Blower Module

Step 1 Examine the replacement blower and verify that all screws securing the two parts of the blower assembly are in place and tight.

NOTE: Units with serial numbers >100742 do not have a muffler bellows.

Step 2 Gently lower the blower assembly onto the four rubber shock mounts. As you lower the blower, be sure that the valve and muffler bellows fit over their respective ports.

Step 3 Replace the four nuts onto the shock mount threads and tighten with the power nut driver set to 10 in-lb.

Step 4 Route the power switch wires through the cable clip on the back of the blower and snap the clip closed.

Step 5 Replace the flow sensor tubes on the blower.

Step 6 Turn the unit upside-down.

NOTE: For units with Serial Numbers >100742, place a tie wrap over the valve to blower connection only and tighten.

Step 7 Place tie wraps over the valve/blower and muffler/blower connections and tighten.

Step 8 Replace the side panel. Apply Loctite 222 to the three side panel screws and the four valve screws, then insert and tighten them to 10 in-lb.

Step 9 Insert the three screws through the rear end cap and tighten to 4 in-lb.

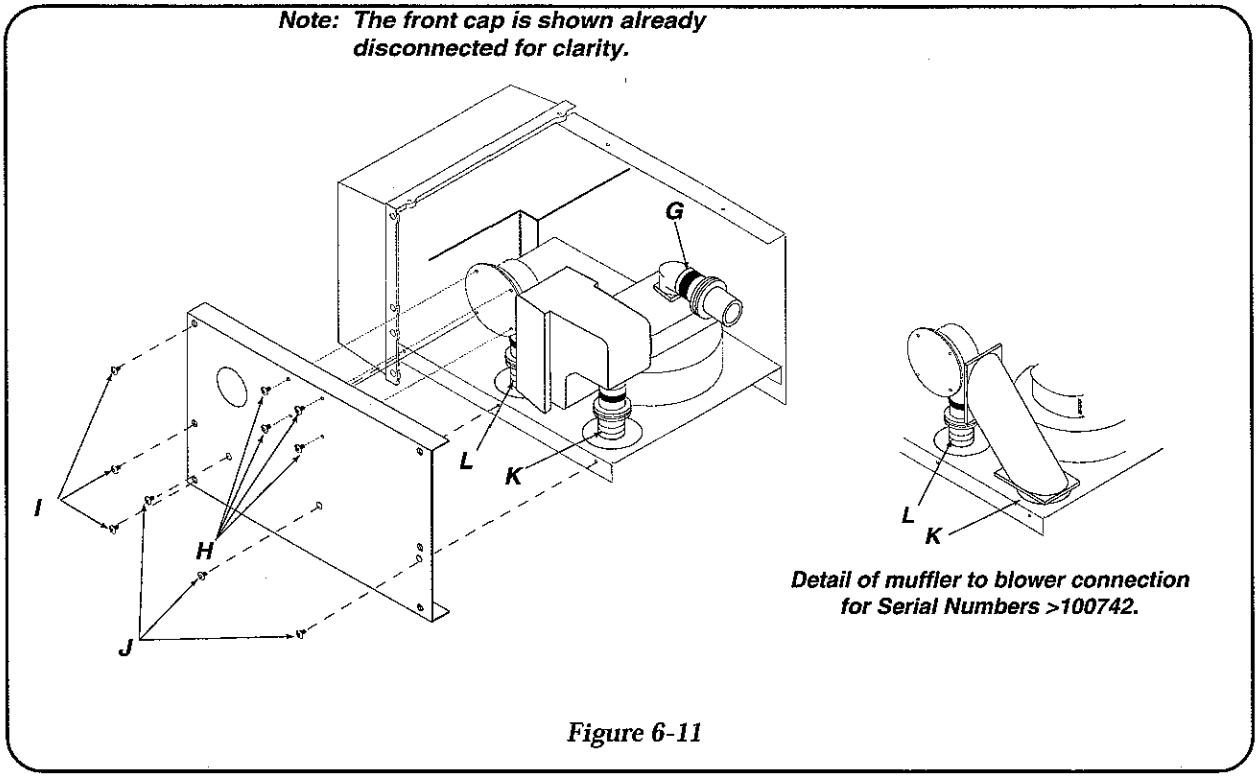


Figure 6-11

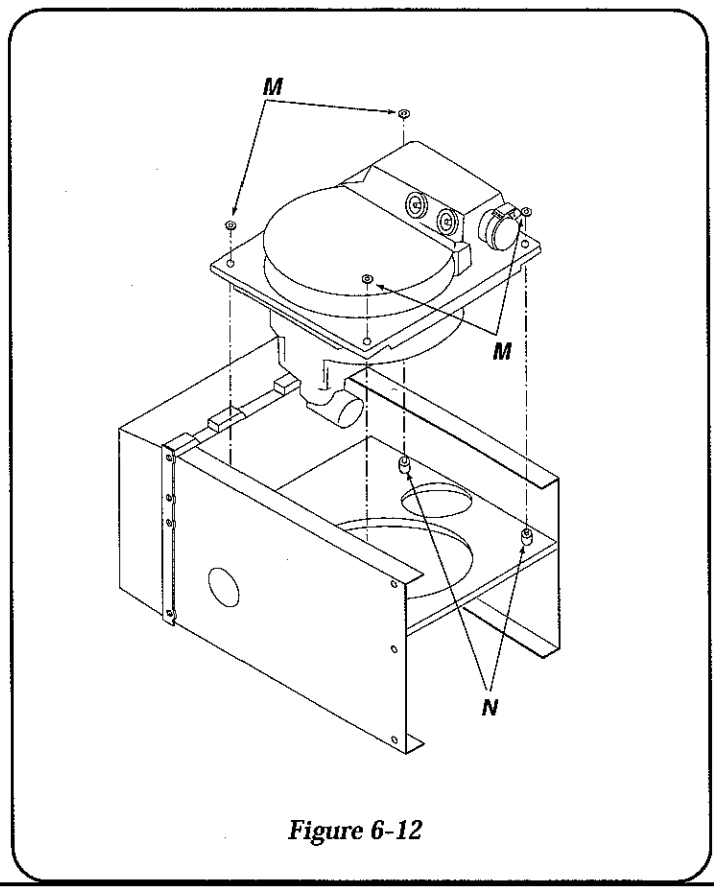


Figure 6-12

Step 10 Place the front end cap in place and slide the air inlet bellows over the blower inlet. Tighten with a hose clamp.

Step 11 Turn the unit right side up. Place the front end cap in front of the chassis and reattach the four power switch wires. If you did not label the wires, see Figure 6-8 for wire placement.

Step 12 Put a hose clamp on the blower outlet, move the front end cap into place, and slide the flexible tubing over the blower outlet. Secure the tubing with a hose clamp.

Step 13 Replace and tighten to 4 in-lb the six Phillip screws that secure the front end cap to the chassis sides.

Step 14 **S/T-D units only:** Reconnect the pressure line to the outside port of the pressure transducer in the rear of the unit.

Step 15 Replace the motor connector, BCB connector, and transformer connector to the MCB on the bottom panel. If you did not label the connectors, refer to Figure 6-9 for proper wiring.

Step 16 Replace the top plate, the bottom plate, and the wraparound.

Step 17 Perform the system adjustment described in Chapter 7.

6.2.6 Replacing the BiPAP 30 Muffler (Serial Numbers <100742)

Replacement Part Number: 552084

NOTE: You may replace the muffler with 332471 (see 6.2.7)

Included in Kit:	Tools Required:
1 BiPAP 30 Muffler subassembly 2 Hose clamps 2 ET-7 Tie wraps	Needle-nose pliers Phillips screwdriver Torque screwdriver set to 4 in-lb Cutting pliers

Refer to Figures: 6-13 to 6-15

Removing the Muffler

Step 1 Remove the wraparound and top plate as described in 6.2.1.

CAUTION: Electronic components used in this unit are subject to damage by static electricity. Use proper static discharge and grounding precautions when servicing this equipment. Service only at a static-free workstation.

NOTE: Be sure to note the position and orientation of each connector on the Motor Control Board (MCB).

Step 2 Disconnect the three electronic connectors and the ground wire on the MCB; remove the bottom plate.

Step 3 **S/T-D only:** Remove the pressure transducer tubing (A) from the pressure transducer at the rear of the unit (B).

Step 4 Release the hose clamp (C) on the blower outlet and remove the flexible tubing from the outlet.

NOTE: Be sure to note the position of the power switch wires before you remove them.

Step 5 Remove the four wires (D) from the rear of the power switch.

Step 6 Remove the three Phillips screws (E) from each side of the front end cap.

Step 7 Verify that all interconnections between the front end cap and the chassis have been disconnected.

Step 8 Turn the unit upside-down and release the hose clamp (F) on the blower inlet. Remove the air inlet bellows from the inlet.

Step 9 Slide the front end cap away from the chassis.

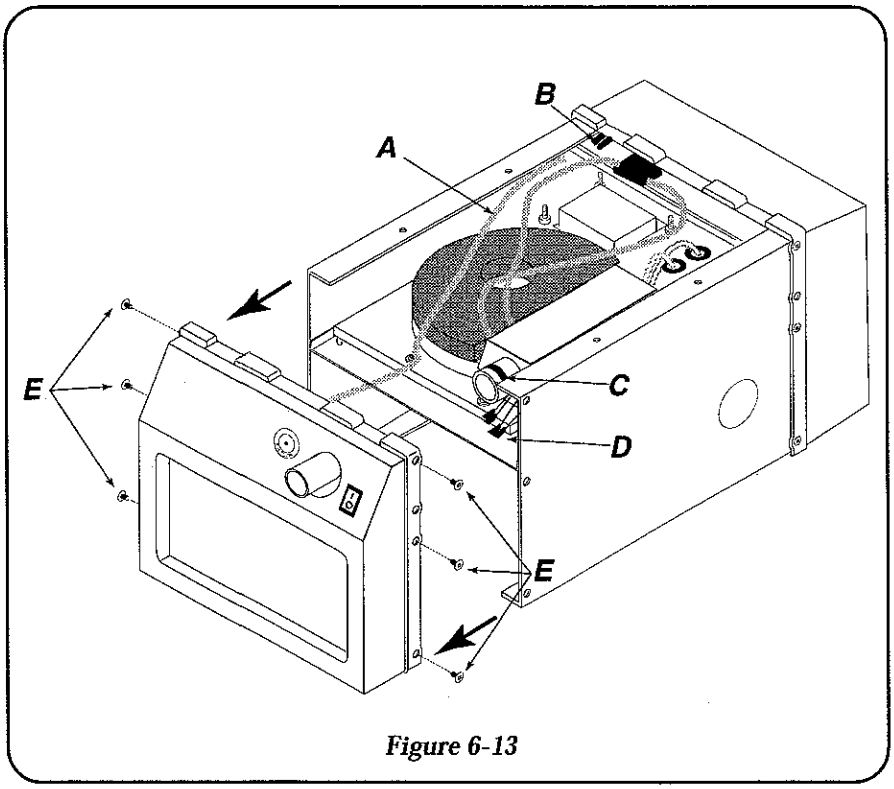


Figure 6-13

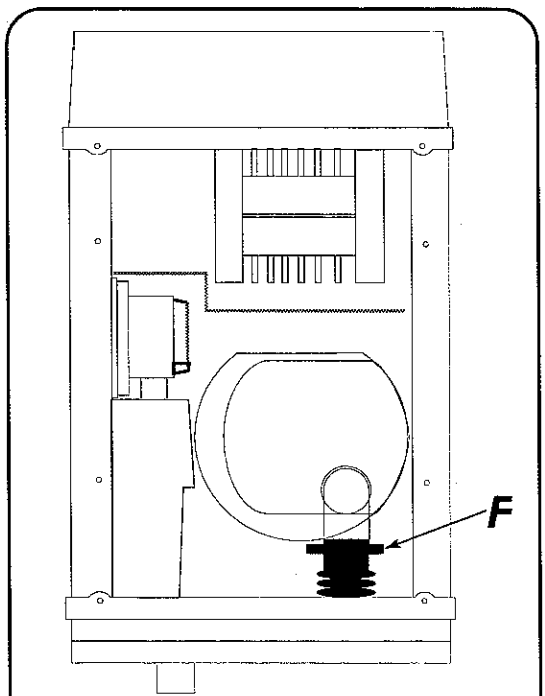


Figure 6-14

Step 10 Cut the tie wraps from the muffler to blower connection (G).

Step 11 Pull the muffler out from the valve connection and from the blower connection.

Replacing the Muffler

Step 1 Verify that the new muffler has a plastic grommet in the valve connector hole and a bellows attached for the blower connection.

Step 2 Place two tie wraps over the blower connection and then slide the muffler bellows over the blower connection while sliding the valve connector into the plastic grommet.

Step 3 Tighten the tie wraps around the bellows and the blower connection.

Step 4 Place the front end cap near the front of the BiPAP 30 unit.

Step 5 Place two tie wraps over the blower inlet connector and then slide the inlet bellows over the blower inlet connector and tighten the tie wraps.

Step 6 Carefully turn the unit right side up.

Step 7 Connect the four power switch wires to the rear of the power switch. If you did not label the wires, refer to Figure 6-8 for the wire locations.

Step 8 Place a hose clamp over the blower outlet connector, slide the blower outlet flex tubing over the blower connector, and tighten the hose clamp.

Step 9 **S/T-D units only:** Slide the pressure transducer tube over the outside port of the pressure transducer at the rear of the unit.

Step 10 Position the front end cap so that the six holes in the side are aligned with the six holes in the chassis. Insert and tighten the six Phillips head screws in the holes.

Step 11 Replace the motor connector, BCB connector, and transformer connector to the MCB on the bottom panel. If you did not label the connectors, refer to Figure 6-9 for proper wiring.

Step 12 Replace the top panel, the bottom panel, and the wraparound.

Step 13 Perform the system adjustment as described in Chapter 7.

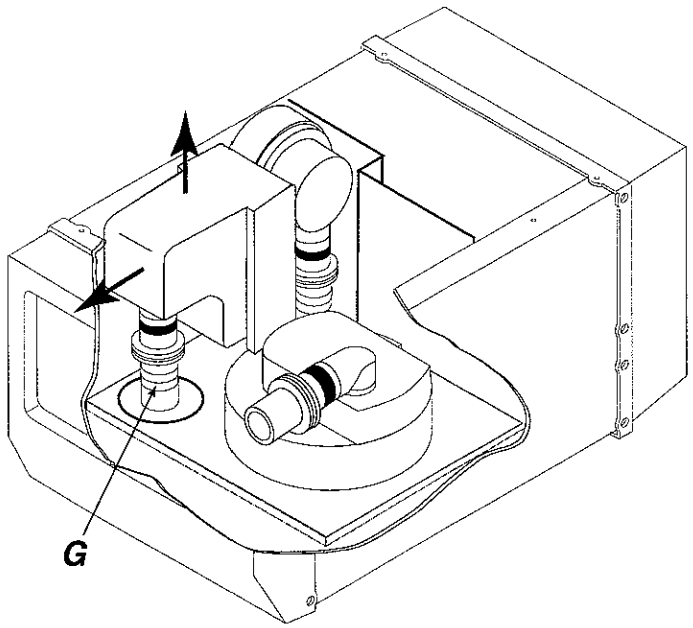


Figure 6-15

6.2.7 Replacing the BiPAP 30 Muffler (Serial Numbers >100742)

Replacement Part Number: 332471

Included in Kit:	Tools Required:
1 BiPAP 30 Muffler subassembly 2 Hose clamps 2 Muffler grommets	Needle nose pliers Phillips screwdriver Torque screwdriver set to 4 in-lb Cutting pliers

Refer to Figures: 6-16 to 6-18

Removing the Muffler

Step 1 Remove the wraparound and top plate as described in 6.2.1.

CAUTION: Electronic components used in this unit are subject to damage by static electricity. Use proper static discharge and grounding precautions when servicing this equipment. Service only at a static-free workstation.

NOTE: Be sure to note the position and orientation of each connector on the Motor Control Board (MCB).

Step 2 Disconnect the three electronic connectors and the ground wire on the MCB; remove the bottom plate.

Step 3 **S/T-D only:** Remove the pressure transducer tubing (A) from the pressure transducer at the rear of the unit (B).

Step 4 Release the hose clamp (C) on the blower outlet and remove the flexible tubing from the outlet.

NOTE: Be sure to note the position of the power switch wires before you remove them.

Step 5 Remove the four wires (D) from the rear of the power switch.

Step 6 Remove the three Phillips screws (E) from each side of the front end cap.

Step 7 Verify that all interconnections between the front end cap and the chassis have been disconnected.

Step 8 Turn the unit upside-down and release the hose clamp (F) on the blower inlet. Remove the air inlet bellows from the inlet.

Step 9 Slide the front end cap away from the chassis.

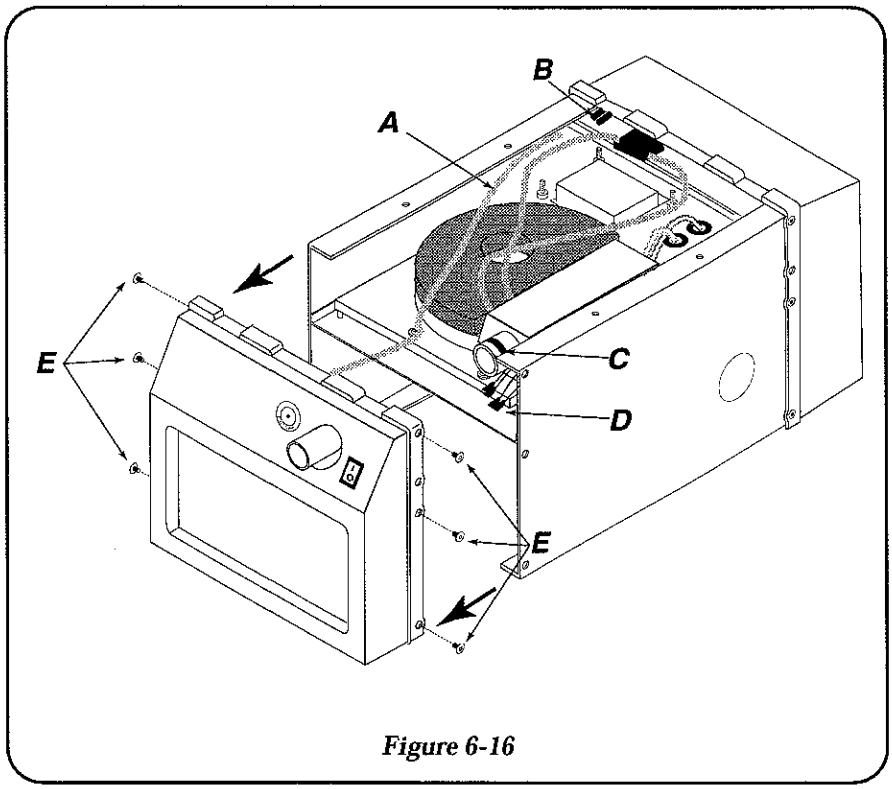


Figure 6-16

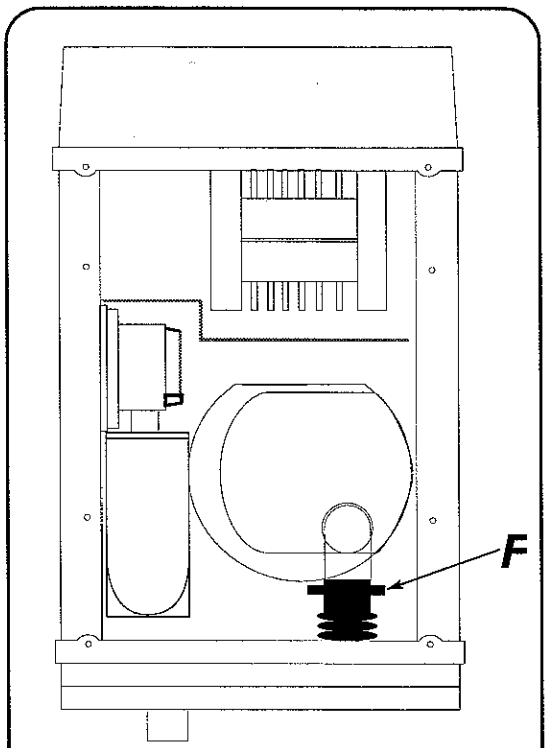


Figure 6-17

Step 10 Remove the 8-32 nut from the shock mount nearest the muffler.

Step 11 Gently pull the muffler (G) away from the blower port, then pull the muffler away from the valve.

Replacing the Muffler

Step 1 Slide the plastic grommets into the valve and blower connector holes on the muffler.

Step 2 Push one end of the new muffler onto the valve port until the muffler contacts the valve magnet.

Step 3 Gently push the blower away from the mounting plate to create more clearance for the muffler installation. Push the muffler onto the blower port until it is $^{3}/_{16}" \pm ^{1}/_{8}"$ from the mounting plate. This space is necessary for proper air flow.

Step 5 Place the front end cap near the front of the BiPAP 30 unit.

Step 6 Place two tie wraps over the blower inlet connector and then slide the inlet bellows over the blower inlet connector and tighten the tie wraps.

Step 7 Carefully turn the unit right side up.

Step 8 Attach the 8-32 nut to the blower shock mount and tighten it with a nut driver set to 10 in-lb.

Step 8 Connect the four power switch wires to the rear of the power switch. If you did not label the wires, refer to Figure 6-8 for the wire locations.

Step 9 Place a hose clamp over the blower outlet connector, slide the blower outlet flex tubing over the blower connector, and tighten the hose clamp.

Step 10 **S/T-D units only:** Slide the pressure transducer tube over the outside port of the pressure transducer at the rear of the unit.

Step 11 Position the front end cap so that the six holes in the side are aligned with the six holes in the chassis. Insert and tighten the six Phillip screws in the holes using a power screwdriver set to 4 in-lb.

Step 12 Replace the motor connector, BCB connector, and transformer connector to the MCB on the bottom panel. If you did not label the connectors, refer to Figure 6-9 for proper wiring.

Step 13 Replace the top panel, the bottom panel, and the wraparound.

Step 14 Perform the system adjustment as described in Chapter 7.

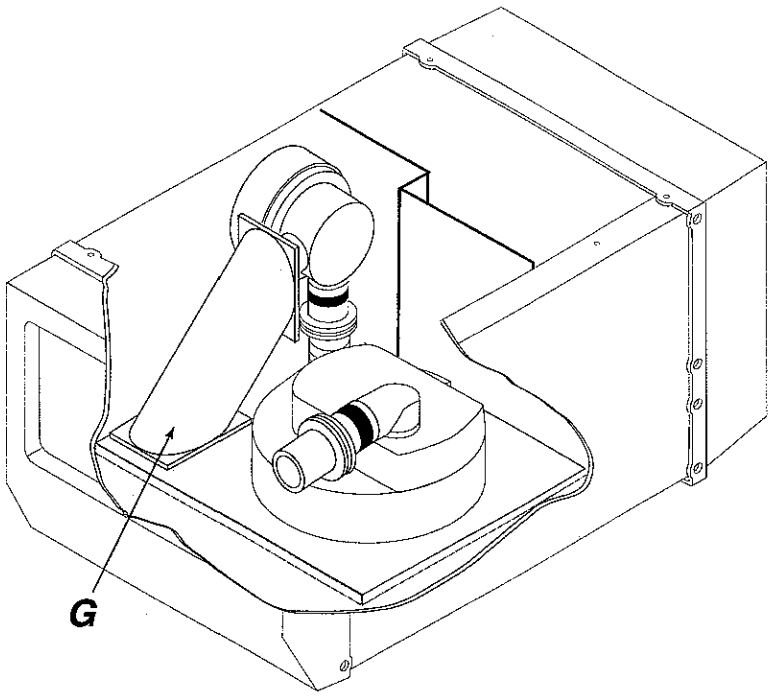


Figure 6-18

6.2.8 Replacing the BiPAP 30 Valve

Replacement Part Number: 332167

Included in Kit:	Tools Required:
1 BiPAP valve assembly 1 ET-3 Wire tie 4 Phillip screws, 6-32 x 1/4" screws 1 Hose clamp	Loctite 222 Pliers Phillips screwdriver Torque screwdriver capable of 4 and 10 in-lb Side cutters

Refer to Figures: 6-19 to 6-21

Removing the Valve

Step 1 Remove the wraparound and top plate as described in Section 6.2.1.

Step 2 Remove the three Phillip screws (A) from each side of the front end cap.

Step 3 Release the hose clamp (B) on the blower outlet and remove the flexible tubing from the outlet.

Step 4 **S/T-D units only:** Remove the pressure sensor tubing (C) from the pressure transducer (D) in the rear end cap.

NOTE: Be sure to note the position of the power switch wires before you remove them.

Step 5 Remove the four wires (E) from the rear of the power switch.

Step 6 Verify that all interconnections between the front end cap and the chassis have been disconnected.

Step 7 Label and then remove the two flow sensor tubes (F) from the blower.

CAUTION: Electronic components used in this unit are subject to damage by static electricity. Use proper static discharge and grounding precautions when servicing the equipment. Service only at a static-free workstation.

NOTE: Be sure to note the position and orientation of each connector on the Motor Control Board.

Step 8 Turn the unit upside-down and remove the bottom plate by disconnecting the three electronic connectors and the ground wire on the Motor Control Board.

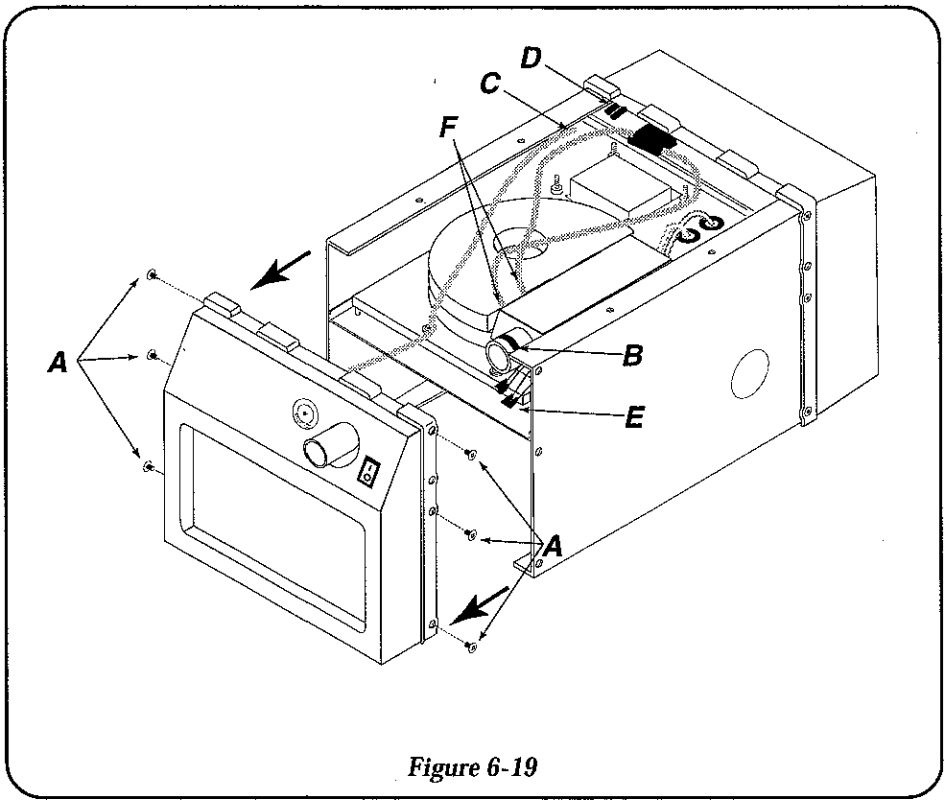


Figure 6-19

Step 9 Release the hose clamp (G) on the blower inlet and remove the air inlet bellows from the inlet.

Step 10 Slide the front end cap away from the chassis.

Step 11 Remove the side panel by removing the four valve screws (H), the three rear end cap screws (I), and the three side panel retaining screws (J).

NOTE: For units with Serial Numbers >100742, cut the tie wrap from the valve to blower connection (L) only. The muffler to blower connection does not have a tie wrap or bellows. See the detail in Figure 6-20.

Step 12 Cut the tie wraps from the muffler to blower connection (K) and the valve to blower connection (L).

Step 13 Remove the valve connector from the BCB in the rear end cap (See Figure 6-21).

Step 14 Pull the valve away from the blower and the muffler.

Replacing the Valve

Step 1 Examine the replacement valve and verify that the blower inlet has a bellows mounted to it.

Step 2 While verifying that the bellows fits over the blower connection, lower the valve onto the blower and simultaneously push the muffler connector into the muffler.

Step 3 Plug the valve connector back into the appropriate location on the BCB.

Step 4 Turn the unit upside-down.

NOTE: For units with Serial Numbers >100742, place a tie wrap over the valve to blower connection only and tighten.

Step 5 Place tie wraps over the valve to blower and muffler to blower connections and tighten.

Step 6 Replace the side panel. Apply Loctite 222 to the three side panel screws and the four valve screws, then insert and tighten them with the power screwdriver set to 10 in-lb.

Step 7 Insert and tighten the three end cap screws with the power screwdriver set to 4 in-lb.

Step 8 Place the front end cap in place and slide the air inlet bellows over the blower inlet. Tighten with a hose clamp.

Step 9 Turn the unit right side up. Place the front end cap in front of the chassis and reattach the four power switch wires. If you did not label the wires, see Figure 6-8 for wire placement.

Step 10 Put a hose clamp on the blower outlet, move the front end cap into place, and slide the flexible tubing over the blower outlet. Secure the tubing with a hose clamp.

Step 11 Replace and tighten the six Phillip screws that secure the front end cap to the chassis sides.

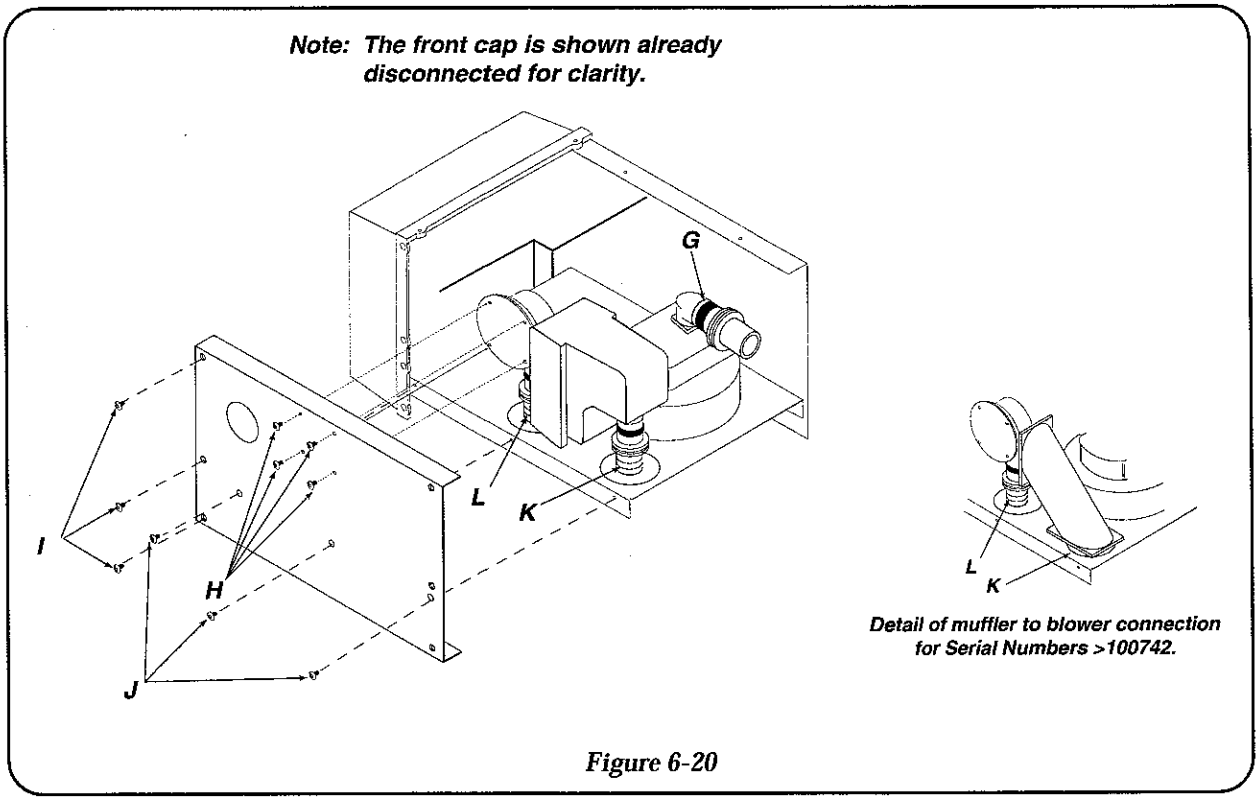


Figure 6-20

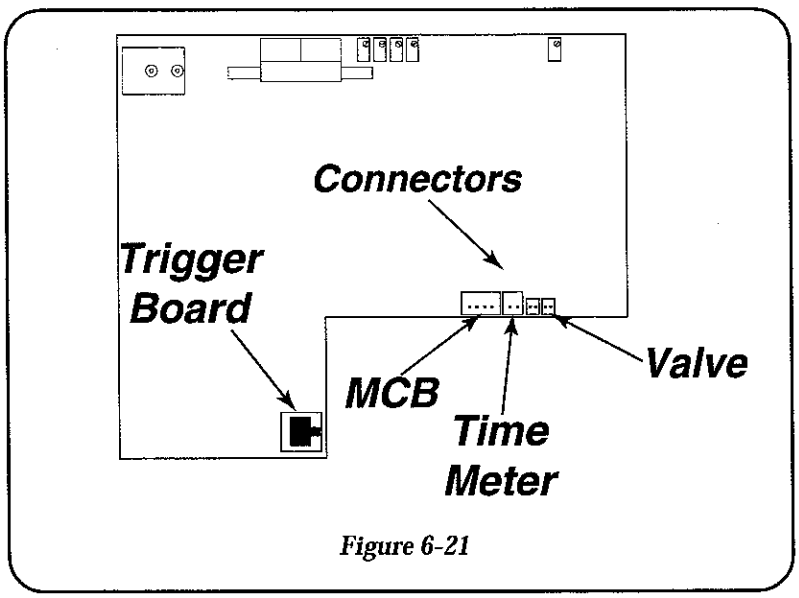


Figure 6-21

Step 12 Replace the motor connector, BCB connector, and transformer connector to the MCB on the bottom panel. If you did not label the connectors, refer to Figure 6-9 for proper wiring.

Step 13 Replace the top plate, the bottom plate, and the wraparound.

Step 14 Perform the system adjustment described in Chapter 7.

6.2.9 Replacing the BiPAP 30 Motor Control Board (MCB)

Replacement Part Number: 552083

Included in Kit:	Tools Required:
1 Motor control board 2 Nylon standoffs 2 Phillip pan head self-tap screws, 6 x 1/4"	Loctite 222 Needle nose pliers Phillips screwdriver Torque tool for nutdriver and screwdriver capable of 8 in-lb and 10 in-lb

Refer to Figures: 6-22 to 6-23

Removing the Motor Control Board

CAUTION: Electronic components used in this unit are subject to damage by static electricity. Use proper static discharge and grounding precautions when servicing the equipment. Service only at a static-free workstation.

Step 1 Remove the wraparound as described in 6.2.1. You do not have to remove the top plate.

Step 2 Carefully lower the bottom plate from the unit. The MCB is mounted to the bottom plate.

CAUTION: Be sure to label the connectors on the MCB before disconnecting them. Incorrect wire location will damage the BiPAP 30 unit.

Step 3 Disconnect the three wire plugs from the MCB.

Step 4 Remove the 4-40 locking nut holding the ground wire to the MCB and remove the ground wire.

Step 5 Remove the two Phillip screws (A) that secure the MCB to the bottom plate.

Step 6 Depress the tabs on the nylon standoffs (B) and slide the MCB off the standoffs.

Replacing the Motor Control Board

Step 1 Slide the MCB over the nylon standoffs until the board snaps into place.

Step 2 Apply Loctite 222 to the two MCB screws, then reinsert the Phillip screws that secure the MCB to the bottom plate. Tighten the screws to 10 in-lb.

Step 3 Reconnect the three wire connectors and the ground wire to the MCB. If you did not label the connectors, use Figure 6-20 as a guide to reconnect the wires.

Step 4 Reattach the ground wire with the 4-40 locking nut and tighten to 8 in-lb.

Step 4 Replace the bottom panel, the top panel, and the wraparound.

Step 5 Perform the system adjustment as described in Chapter 7.

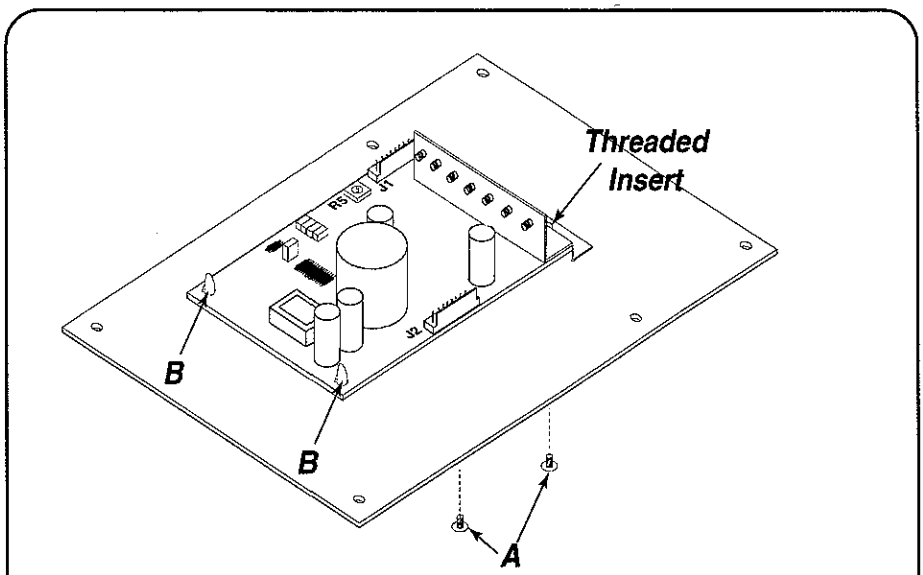


Figure 6-22

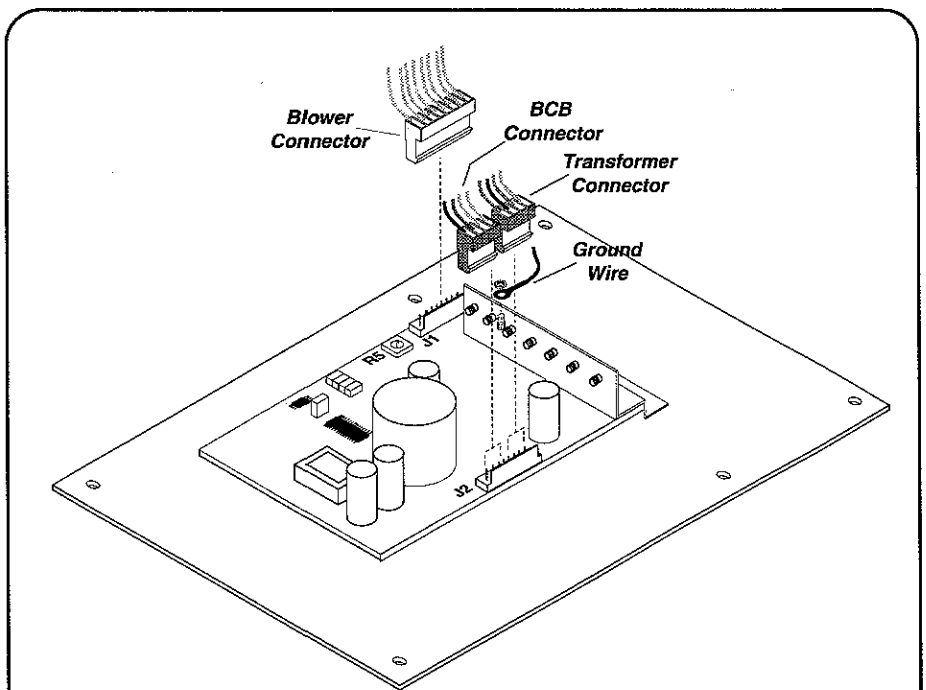


Figure 6-23

6.2.10 Replacing the BiPAP S/T 30 or S/T-D 30 Control Board

Replacement Part Numbers: **S/T 30: 552089** **S/T-D 30: 552088**

Included in Kit:	Tools Required:
1 S/T or S/T-D Control board 6 3/8" Pan head self-tapping screws & nylon washers 1 4-40 Nut w/ lock washer (S/T-D ONLY) 2 4-40 Screw jacks (S/T-D ONLY) 1 3/16" OD Spacer (S/T-D ONLY)	Phillips screwdriver Torque tool for nutdriver and screwdriver capable of 4, 6, 8, and 10 in-lb manual nut driver set at 6 in-lb Needle nose pliers

Refer to Figures: 6-24 to 6-28

Removing the Control Board

CAUTION: Electronic components used in this unit are subject to damage by static electricity. Use proper static discharge and grounding precautions when servicing the equipment. Service only at a static-free workstation.

The Control Board is mounted inside the rear end cap.

Step 1 Remove the wraparound as described in 6.2.1.

Step 2 Carefully lower the bottom plate from the unit.

CAUTION: Be sure to label the connectors on the MCB before disconnecting them. Incorrect wire placement will damage the BiPAP 30 unit.

Step 3 Disconnect the three connectors and the ground wire from the MCB and set the bottom plate aside.

Step 4 Disconnect the flow transducer tubes (A) from the Control Board.

Step 5 **S/T-D units only**—disconnect the pressure transducer tube (B) from the Control Board.

Step 6 Turn the unit so that you are facing the back. Open the rear panel door (not shown on drawing) and remove the control knobs (C). The knobs pull off the potentiometer shafts.

Step 7 Remove the hex nuts (D) that secure the potentiometer shafts to the rear panel. Remove the nuts and lock washers (E).

Step 8 **S/T-D units only**—Use a 3/16" nut driver to remove the two hex head screwjacks (F) that secure the DCP connector to the rear end cap.

Step 9 Remove the six Phillip head screws (G) that secure the rear end cap to the chassis.

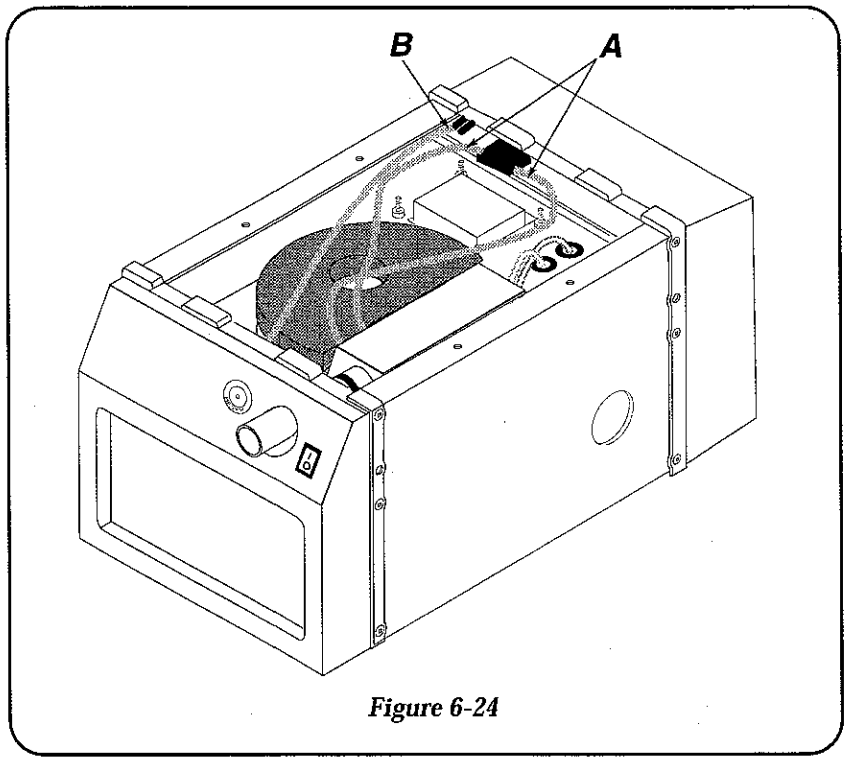


Figure 6-24

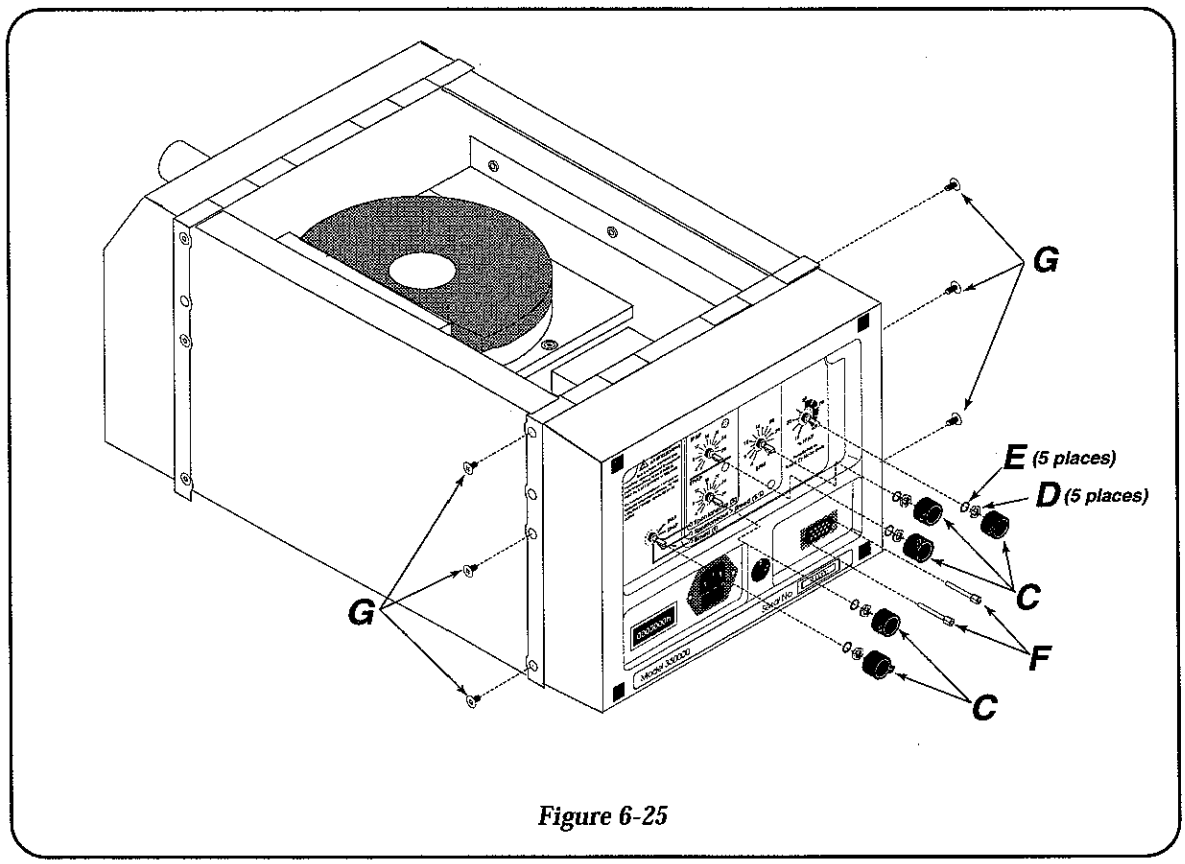


Figure 6-25

Step 10 Turn the unit upside-down. Remove the ground wire from the Control Board (See Figure 6-26 for the ground wire location) by removing the hex head nut that holds the wire.

Step 11 Move the rear end cap away from the chassis within the limits of the wires.

Step 12 Unplug the Motor Control Board (MCB), time meter, and valve connectors from the Control Board (See Figure 6-26).

Step 13 Unplug the Trigger Board connector from the Control Board.

Step 14 With power screwdriver, remove the six screws (H) that secure the Control Board to the rear end cap.

Step 15 Pull the Control Board away from the rear end cap.

Replacing the Control Board

Step 1 See Figure 6-27. Gently bend the heat sinks for the regulators U22 and U42 down so that when the board is installed, the heat sinks do not contact either side of the channel between the BCB mounting area and the AC inlet.

CAUTION: When you are placing the new Control Board into the rear end cap, verify that the potentiometer posts are lined up with their respective control board holes and that the DCP connector is aligned with its hole.

Step 2 Place the new Control Board in the rear end cap, being sure to align the six screw holes with the mounting holes in the rear end cap. The Control Board should be oriented as shown in Figure 6-23 as you are facing the inside of the end cap with the unit right side up.

Step 3 **S/T-D units only**—replace the two hex head standoffs through the holes in the control panel on either side of the DCP connector. Tighten to 4 in-lb.

CAUTION: To prevent the possibility of electronics damage, the Control Board mounting screws must each have a nylon washer before you place them in the Control Board.

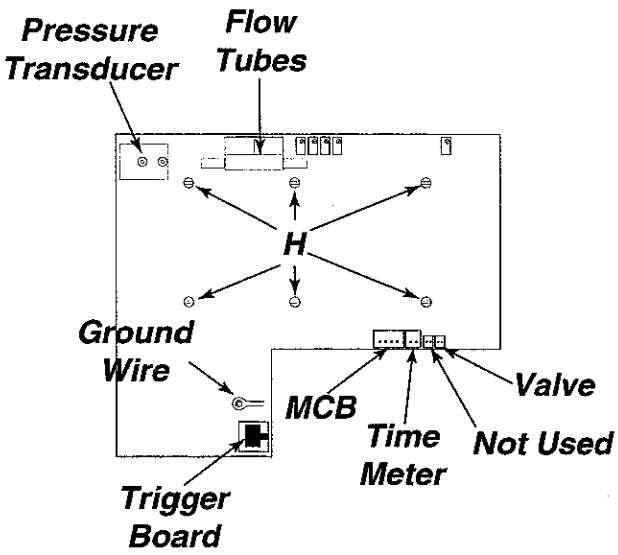


Figure 6-26

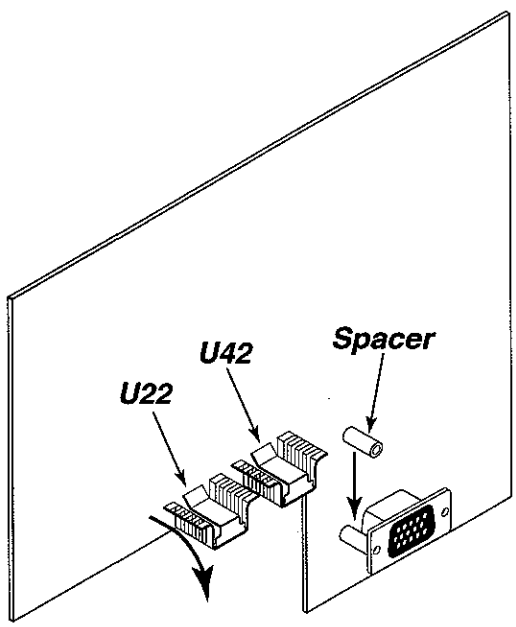


Figure 6-27

Step 4 Insert and tighten the six mounting screws with nylon washers in the order shown in Figure 6-28. Tighten to 6 in-lb.

Step 5 Turn the rear end cap so that you are facing the rear of it. Install the original nuts and washers on the potentiometer shafts and tighten to 4 in-lb.

Step 6 Push the control knobs onto the potentiometer shafts. The shafts are keyed so that the knobs can only be oriented in one way. All knobs are identical and may be placed onto any potentiometer.

Step 7 **S/T-D units only:** See Figure 6-28. Turn the rear end cap over so you are facing the BCB. Slide the spacer over the inner jack screw protruding through the hole in the BCB. The spacer slides through the BCB and contacts the bottom of the DCP connector.

Step 8 Slide the ring terminal on the ground wire onto the jack screw and spacer. Attach the 4-40 nut with lock washer and tighten to 8 in-lb.

CAUTION: The MCB, time meter, and valve connectors must be attached to the correct pins. Use Figure 6-28 for reference. Incorrect connector placement will damage the BiPAP unit.

Step 9 Reconnect the trigger board, MCB, time meter, and valve connectors to the BCB.

Step 10 Align the six chassis mounting holes in the rear end cap with the six chassis holes. Insert the six Phillips head screws and tighten to 4 in-lb.

Step 11 Replace the flow transducer tubes as shown in Figure 6-24. **For S/T-D units only:** Connect the pressure transducer tube to the outside port of the pressure transducer.

Step 12 Replace the wire connectors and ground wire on the MCB, then reattach the bottom plate to the BiPAP unit.

Step 13 Replace the top plate and the wraparound.

Step 14 Perform the system adjustment as described in Chapter 7.

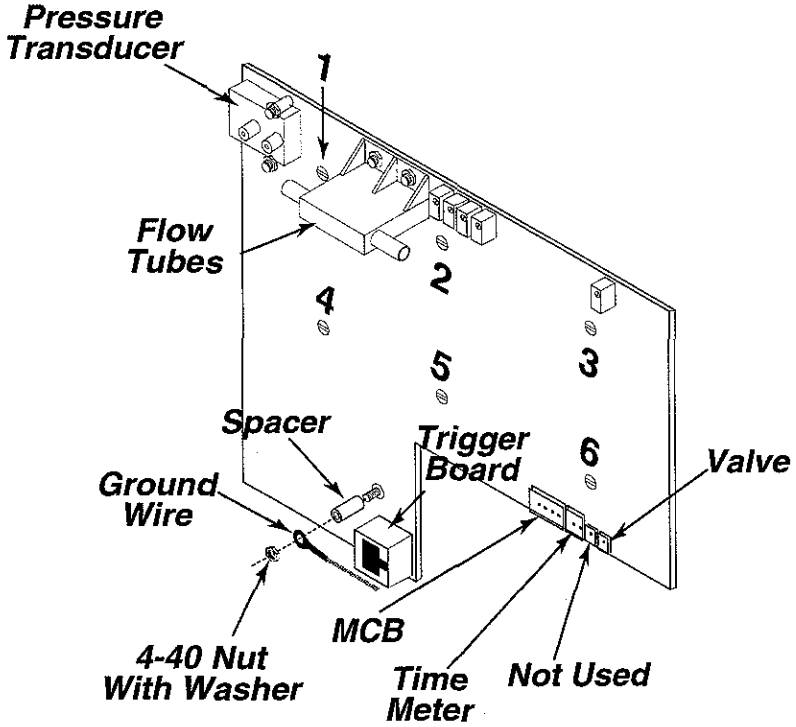

Pressure Transducer
1
Flow Tubes
2
4
5
3
Spacer
Trigger Board
6
Valve
Ground Wire
MCB
4-40 Nut With Washer
Time Meter
Not Used

Figure 6-28

6.2.11 Replacing the BiPAP 30 Time Meter

Replacement Part Number: 552090

Included in Kit:	Tools Required:
1 BiPAP 30 Time meter 1 ET-3 Wire tie 2 Time meter hour labels	Phillips screwdriver Torque screwdriver capable of 4 in-lb Hot glue gun Alcohol (optional) Needle nose pliers

Refer to Figure: 6-29

Removing the Time Meter

CAUTION: Electronic components used in this unit are subject to damage by static electricity. Use proper static discharge and grounding precautions when servicing the equipment. Service only at a static-free workstation.

The Control Board is mounted inside the rear end cap.

Step 1 Remove the wraparound as described in Procedure 1. You do not need to remove the top plate.

Step 2 Carefully lower the bottom plate from the unit.

CAUTION: Be sure to label the connectors on the MCB before disconnecting them. Incorrect wire location will damage the BiPAP 30 unit.

Step 3 Disconnect the three wire plugs and the ground wire from the MCB and set the bottom plate aside.

Step 4 Turn the unit upside-down. Remove the time meter connector (A) from the Control Board.

Step 5 Remove the hot melt glue on both sides of the time meter. A small amount of alcohol allowed to saturate the glue for a few minutes may help loosen the glue. You may have to lightly score the glue to loosen it completely. Peel the glue away from the rear end cap and the time meter.

Step 6 Depress the locking tabs (C) on either side of the time meter and push the meter through the hole in the end cap. Remove any remaining glue on the end cap.

Replacing the Time Meter

Step 1 Push the new time meter through the hole in the rear end cap until the locking tabs expand.

Step 2 Apply hot melt glue to both sides of the time meter.

Step 3 Reconnect the time meter wires to the BCB at the location shown in Figure 6-24.

Step 4 Turn the unit right-side up.

Step 5 Take out the two time meter labels that are supplied in the replacement kit. Write the hours appearing on the old time meter and the date the meter was replaced on both labels. Apply one label around the body of the old time meter. To apply the second label to the BiPAP 30 unit, turn the unit so that the rear end cap is facing up. Place the label on the bottom of the rear end cap, adjacent to the Model Number.

Step 6 Reconnect the three wire connectors and the ground wire to the MCB. If you did not label the wires, use Figure 6-23 as a guide.

Step 7 Replace the bottom plate, the top plate, and the wraparound.

Step 8 Perform the system adjustment as described in Chapter 7.

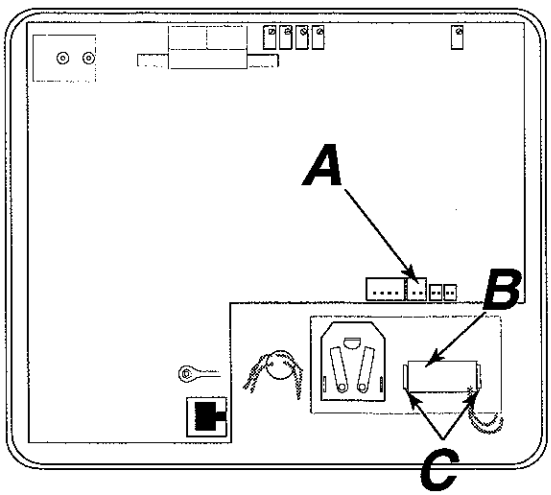


Figure 6-29

6.2.12 Replacing the BiPAP 30 AC Inlet Connector

Replacement Part Number: 332214

Included in Kit:	Tools Required:
1 BiPAP 30 AC inlet with fuse drawer 1 ET-3 Wire tie 2 Thread-cutting screws, 6 x 3/8"	Phillips screwdriver Torque screwdriver capable of 4 and 6 in-lb Side cutters Pliers

Refer to Figure: 6-30

Removing the AC Inlet Connector

CAUTION: Electronic components used in this unit are subject to damage by static electricity. Use proper static discharge and grounding precautions when servicing the equipment. Service only at a static-free workstation.

Step 1 Remove the wraparound as described in 6.2.1. You do not need to remove the top plate.

Step 2 Carefully lower the bottom plate from the unit.

CAUTION: Be sure to label the connectors on the MCB before disconnecting them. Incorrect wire location will damage the BiPAP 30 unit.

Step 3 Disconnect the three wire plugs and the ground wire from the MCB and set the bottom plate aside.

Step 4 Turn the unit upside-down.

Step 5 Pull the vinyl boot (A) to expose the AC inlet wire connections.

CAUTION: Before you remove the wire connectors on the AC inlet (B), label the connectors as shown in the illustration to reconnect them properly .

Step 6 Use a pair of pliers to remove the three connectors from the AC inlet.

Step 7 From the outside back of the unit, unscrew the two Phillip head screws that secure the AC inlet to the rear end cap.

Step 8 Pull the AC inlet out of the rear end cap.

Step 9 Remove the fuses from the fuse drawer and insert them into the new fuse drawer.

Replacing the AC Inlet Connector

Step 1 Insert the new AC inlet into the rear end cap.

Step 2 Insert and tighten the two 6 x 3/8" Phillip head screws to 6 in-lb.

Step 3 Turn the unit upside-down and reconnect the three wires to the AC inlet spade connectors, as shown in Figure 6-30.

Step 4 Replace the boot over the AC inlet connectors.

Step 4 Turn the unit right-side up.

Step 5 Reconnect the three connectors and the ground wire to the MCB. If you did not label the connectors, refer to Figure 6-20 for the proper connector placement. Replace the bottom plate.

Step 6 Replace the bottom plate, the top plate, and the wraparound.

Step 7 Perform the system adjustment as described in Chapter 7.

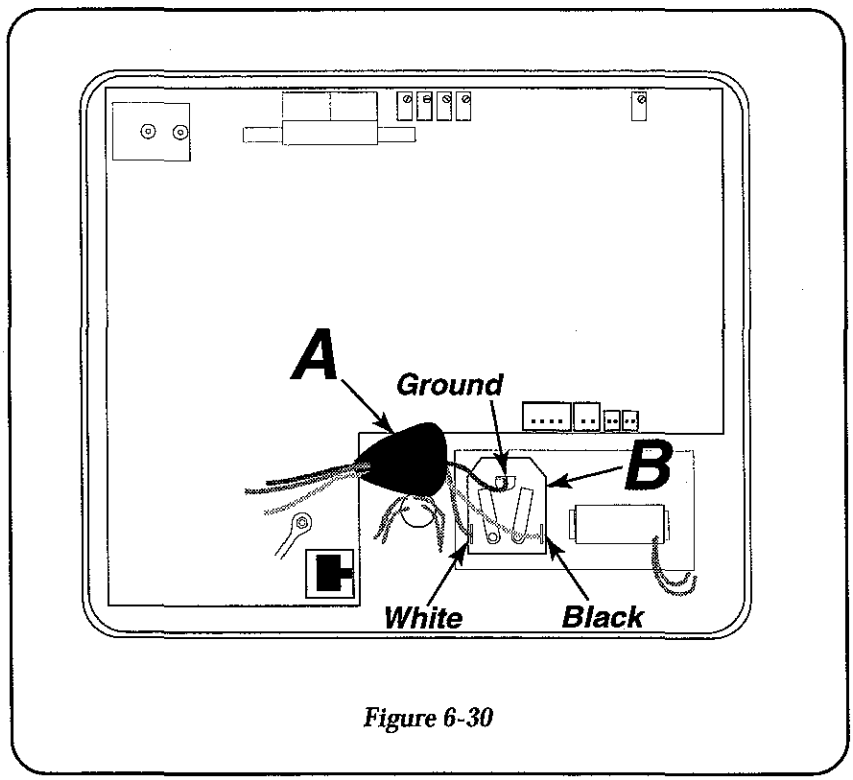


Figure 6-30

6.2.13 Replacing the BiPAP 30 Voltage Selector Switch

Replacement Part Number: 552066

Included in Kit:	Tools Required:
1 BiPAP 30 Voltage selector switch 3 ET-3 Wire ties	Torque tool for screwdriver and nut driver capable of 4, 7, and 8 in-lb Needle nose pliers Heat gun Solder iron with adjustable temperature Cutting pliers Phillips screwdriver

Refer to Figures: 6-31 to 6-35

Removing the Voltage Selector Switch

CAUTION: Electronic components used in this unit are subject to damage by static electricity. Use proper static discharge and grounding precautions when servicing the equipment. Service only at a static-free workstation.

Step 1 Remove the wraparound and top plate as described in 6.2.1.

Step 2 Carefully lower the bottom plate from the unit.

CAUTION: Be sure to label the connectors on the MCB before disconnecting them. Incorrect wire location will damage the BiPAP 30 unit.

Step 3 Disconnect the three wire plugs and the ground wire from the MCB and set the bottom plate aside.

Step 4 Disconnect the flow transducer tubes (A) from the Control Board.

Step 5 **S/T-D units only**—disconnect the pressure transducer tube (B) from the Control Board.

Step 9 Remove the six Phillip screws (C) that secure the rear end cap to the chassis.

Step 10 Turn the unit upside-down. Remove the ground wire (D) from the Control Board for the ground wire's location by removing the hex head nut that holds the wire.

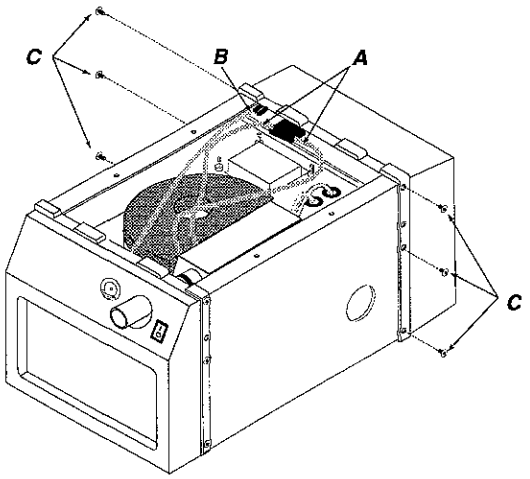


Figure 6-31

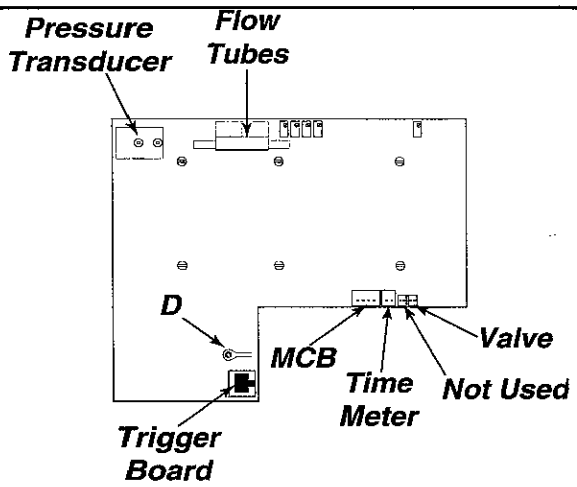


Figure 6-32

CAUTION: Be sure to label the connectors on the AC inlet before disconnecting the wires.

Step 11 Remove the boot (E, Figure 6-30) that covers the AC inlet connectors then remove the three wires from the connectors.

CAUTION: Before you remove the wire connectors on the transformer, label the transformer as shown in the illustration to reconnect them properly.

Step 12 Remove the four voltage selector switch wires from the transformer inlet as shown in Figure 6-33. Leave the power switch wires attached. The transformer is shown from the bottom, with the back of the BiPAP unit facing you.

Step 13 Cut the connectors off the transformer side of the voltage selector switch wires ONLY.

Step 14 Move the rear end cap away from the unit.

Step 15 Use a pair of needle nose pliers to loosen the nylon nut (F) that holds the voltage selector switch. Feed the four wires through the nut to remove the voltage selector switch.

Step 16 Pull the voltage selector switch out of the rear of the end cap.

Replacing the Voltage Selector Switch

Step 1 Insert the new voltage selector switch into the rear end cap. Verify that the key at the top of the voltage selector switch matches the slot in the cabinet.

Step 2 Tighten the nylon nut against the inside back of the rear end cap.

Step 3 Verify that each of the four wires supplied with the voltage selector switch has clear tubing and a section of heat shrink tubing already placed on the wire.

NOTE: Set the temperature of the soldering iron to 650 °F.

Step 4 Solder each of the wires to the voltage selector switch at the locations shown in Figure 6-35.

Step 5 Clean the four solder connections. We suggest cotton swabs soaked in isopropyl alcohol.

Step 6 Slide the four pieces of heat shrink tubing over the solder connections. Shrink the tubing onto the solder joints with a heat gun.

Step 7 Place the rear end cap onto the chassis. Insert and tighten the six Phillip screws.

Step 8 Reconnect the three connectors and the ground wire to the MCB and replace the bottom plate, the top plate, and the wraparound.

Step 9 Perform the system adjustment as described in Chapter 7.

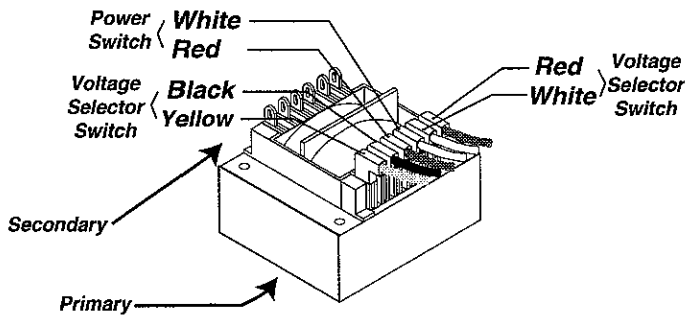


Figure 6-33

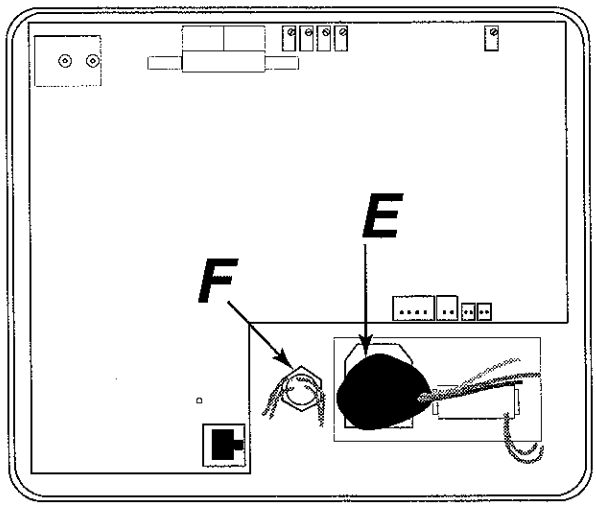


Figure 6-34

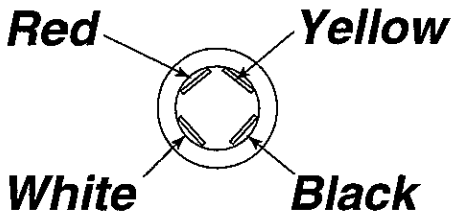


Figure 6-35

6.2.14 Replacing the BiPAP 30 Transformer

Replacement Part Number: 552086

Included in Kit:	Tools Required:
1 Transformer 4 Machine screws, 8-32 x 1 7/8" Phillip pan head 4 Nylon shoulder washer	Phillips screwdriver Torque screwdriver capable of 4 and 10 in-lb Needle nose pliers Loctite 222

Refer to Figures: 6-36 to 6-37

Removing the Transformer

CAUTION: Electronic components used in this unit are subject to damage by static electricity. Use proper static discharge and grounding precautions when servicing the equipment. Service only at a static-free workstation.

Step 1 Remove the wraparound as described in 6.2.1.

Step 2 Carefully lower the bottom plate from the unit.

CAUTION: Be sure to label the connectors on the MCB before disconnecting them. Incorrect wire location will damage the BiPAP 30 unit.

Step 3 Disconnect the three wire plugs and the ground wire from the MCB and set the bottom plate aside.

Step 4 Turn the unit upside-down.

Step 5 Unplug the Trigger Board connector (A) from the Control Board (B).

CAUTION: Be sure to label the connectors and the transformer before disconnecting the connectors. Incorrect wire location will damage the BiPAP 30 unit.

Step 6 Unplug the ten connectors (C) from the transformer.

Step 7 With the power screwdriver, remove the four machine screws (D) that secure the transformer to the chassis plate. The screws are equipped with nylon shoulder washers (E) for insulation.

Step 8 Lift the transformer out of the chassis.

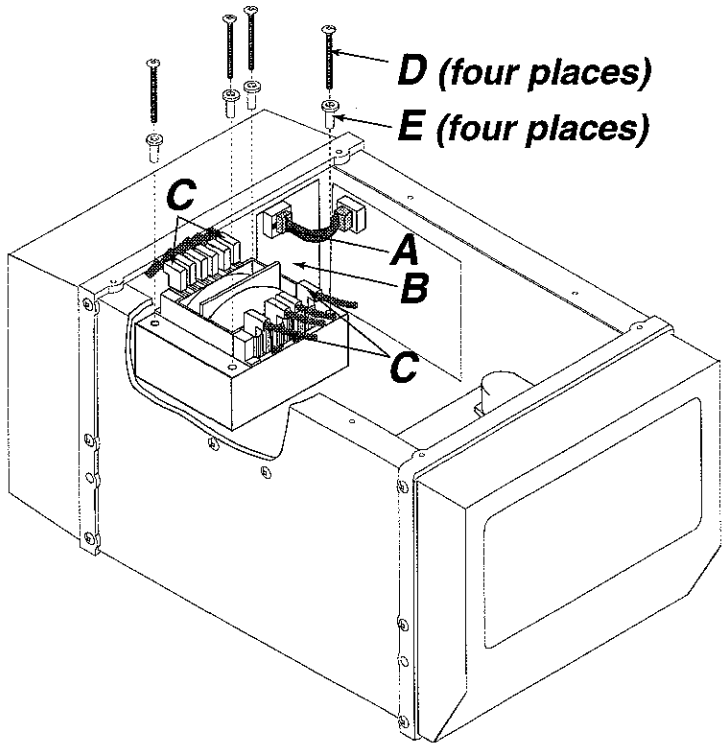


Figure 6-36

Replacing the Transformer

Step 1 Lower the new transformer into the chassis.

Step 2 Apply Loctite 222 to the machine screws.

Step 3 Place nylon shoulder washer in the transformer mounting holes, then insert the four machine screws into the mounting holes.

Step 4 Tighten the four machine screws to 10 in-lb.

Step 5 Plug the ten connectors back onto the transformer according the Figure 6-37.

Step 6 Plug the Trigger Board connector back into the Control Board.

Step 7 Place the unit on the rear end cap; move the bottom plate near the unit; reconnect the three connectors and the ground wire to the MCB. If you did not label the connectors before removing them, use Figure 6-23 as a guideline to replace the plugs.

Step 6 Remount the bottom plate, the top plate, and the wraparound.

Step 7 Perform the system adjustment as described in Chapter 7.

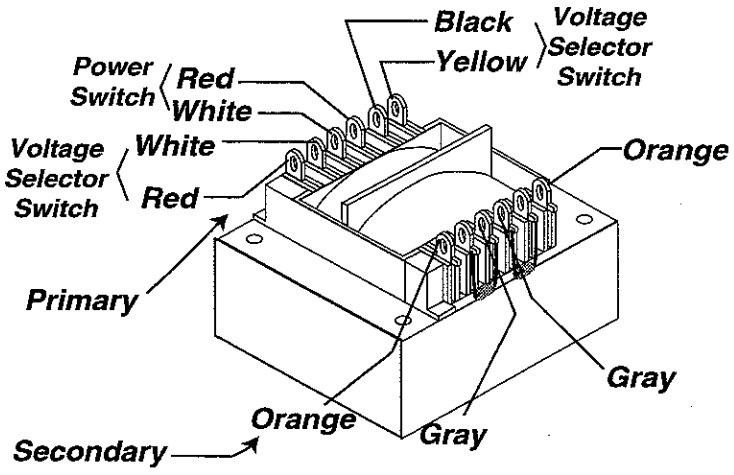

View is from the front
Black
Yellow
Voltage Selector Switch
Power Switch
Red
White
Voltage Selector Switch
White
Red
Orange
Primary
Gray
Orange
Gray
Secondary

Figure 6-37

6.2.15 Replacing the Trigger Board

Replacement Part Number: 552104

Included in Kit:	Tools Required:
1 BiPAP 30 Trigger Board 3 6-32 x 1/4" Truss head Phillips screws 4 Nylon standoffs	Phillips screwdriver Torque screwdriver capable of 4 and 10 in-lb Pliers Loctite 222

Refer to Figures: 6-38 to 6-41

Removing the Trigger Board

CAUTION: Electronic components used in this unit are subject to damage by static electricity. Use proper static discharge and grounding precautions when servicing the equipment. Service only at a static-free workstation.

Step 1 Remove the wraparound as described in 6.2.1.

Step 2 Carefully lower the bottom plate from the unit.

CAUTION: Be sure to label the connectors on the MCB before disconnecting them. Incorrect wire location will damage the BiPAP 30 unit.

Step 3 Disconnect the three wire plugs and the ground wire from the MCB and set the bottom plate aside.

Step 4 Turn the unit upside-down.

Step 5 Unplug the Trigger Board connector (A).

Step 6 Turn the unit right side up.

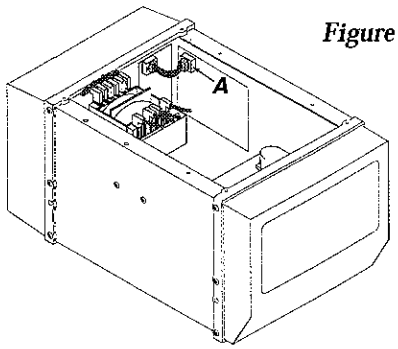
Step 7 Remove the Phillip screws (B) from the front and rear end caps on the Trigger Board side (three screws in each).

Step 8 Remove the three Phillip screws (C) that secure the plate (D) to the chassis.

Step 9 Move the side plate away from the chassis.

Step 10 Compress the nylon standoffs (E) that secure the Trigger Board, and remove the Trigger Board from the unit.

Figure 6-38



End Caps are shown separated from chassis for clarity.
You need not pull them away to remove side panel.

Figure 6-39

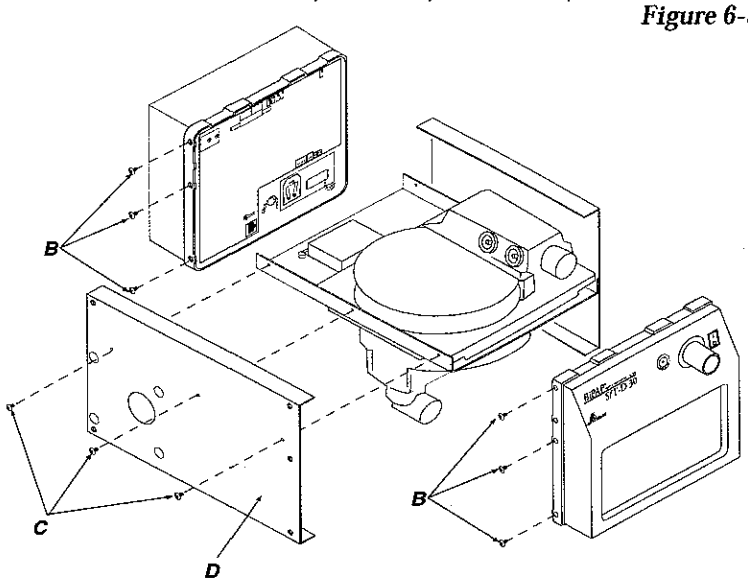
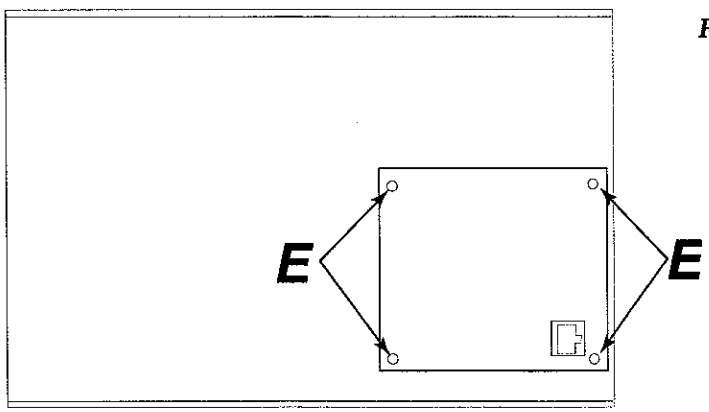


Figure 6-40



Replacing the Trigger Board

Step 1 Place the new Trigger Board onto the nylon standoffs and press the board into place at the four corners.

Step 2 Replace the side panel on the chassis; insert and tighten the three screws that secure the plate to the chassis.

Step 3 Replace the front and rear end caps; insert and tighten the three screws in each end cap.

Step 4 Turn the unit upside down and plug the Trigger Board to Control Board connector into the Trigger Board connector.

Step 5 Turn the unit right side up.

Step 6 Place the unit on the rear end cap; move the bottom plate near the unit; reconnect the three connectors and the ground wire to the MCB. If you did not label the connectors before removing them, use Figure 6-37 as a guideline to replace the plugs.

Step 7 Remount the bottom plate, the top plate, and the wraparound.

Step 8 Perform the system adjustment as described in Chapter 7.

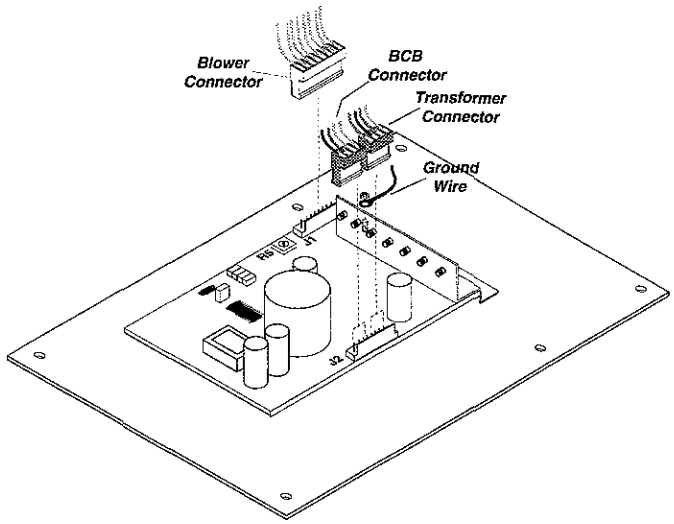

Blower Connector
BCB Connector
Transformer Connector
Ground Wire

Figure 6-41

6.2.16 Replacing the Power Switch

Replacement Part Number: 552127

Included in Kit:	Tools Required:
1 Power Switch	Phillips screwdriver Torque screwdriver capable of 4 in-lb

Refer to Figures: 6-42 to 6-43

Removing the Power Switch

CAUTION: Electronic components used in this unit are subject to damage by static electricity. Use proper static discharge and grounding precautions when servicing the equipment. Service only at a static-free workstation.

Step 1 Remove the wraparound as described in 6.2.1.

Step 2 Carefully lower the bottom plate from the unit, and then remove the three wire connectors and the ground wire from the MCB.

Step 3 Remove the six Phillip screws (A) that secure the front end cap to the chassis.

Step 4 Pull the front end cap away from the chassis as far as possible, within the limits of the blower connections.

NOTE: Be sure to note the position of the power switch wires before you remove them.

Step 5 Remove the four wires (B) from the rear of the power switch (C). Remove the power switch by carefully prying the switch out from the front of the BiPAP unit.

Replacing the Power Switch

Step 1 Push the new power switch through the power switch opening in the front end cap.

Step 2 Reconnect the four wires to the rear of the switch. Use Figure 6-43 as a guide to reconnect the wires.

Step 3 Position the front end cap with the six mounting holes aligned. Insert and tighten the six Phillip screws to 4 in-lb.

Step 4 Reconnect the three wire connectors and the ground wire to the MCB. If you did not label the wires, use Figure 6-37 as a guide.

Step 5 Replace the bottom plate, the top plate, and the wraparound.

Step 6 Perform the system adjustment as described in Chapter 7.

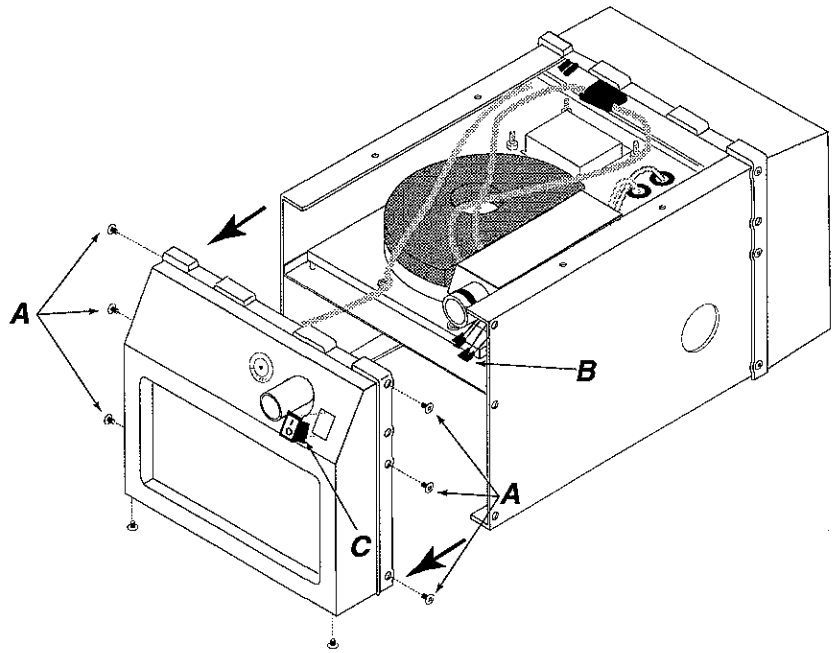


Figure 6-42

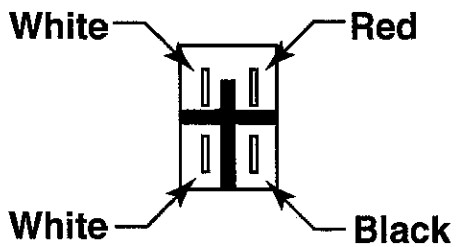


Figure 6-43

6.2.17 Replacing the Pressure Port (S/T-D Only)

Replacement Part Number: 552106

Included in Kit:	Tools Required:
1 Pressure port 1 ET-3 Wire tie 2 Hose clamps	Torque screwdriver capable of 4 in-lb Phillips screwdriver Slotted screwdriver Wire cutters $^{13}/_{16}$" socket

Refer to Figures: 6-44 to 6-45

Removing the Pressure Port

CAUTION: Electronic components used in this unit are subject to damage by static electricity. Use proper static discharge and grounding precautions when servicing the equipment. Service only at a static-free workstation.

Step 1 Remove the wraparound and top plate as described in 6.2.1.

Step 2 Turn the unit upside down. Remove the hose clamp (A) that secures the bellows to the blower inlet.

Step 3 Turn the unit right side up. Cut the wire tie that secures the pressure tubing (B) to the pressure port (C), and move the tubing out of the way.

Step 4 Remove the hose clamp (D) that secures the flexible connector to the blower outlet.

Step 5 Remove the six Phillip screws (E) that secure the front end cap to the chassis.

Step 6 Pull the front end cap away from the chassis as far as possible, within the limits of the power switch connections.

Step 7 Use wire cutters to remove the pressure port retaining ring from the inside of the front end cap.

Step 8 Remove the pressure port from the front end cap.

Replacing the Pressure Port

Step 1 Apply the "PRESSURE" label to the new pressure port as follows:

a. Hold the port with the flat portion on top.
b. Peel the backing off the label and place it on the front bottom center of the port.

Step 2 Slide the port into the front end cap. The hole is flattened on top to match the flat portion of the port.

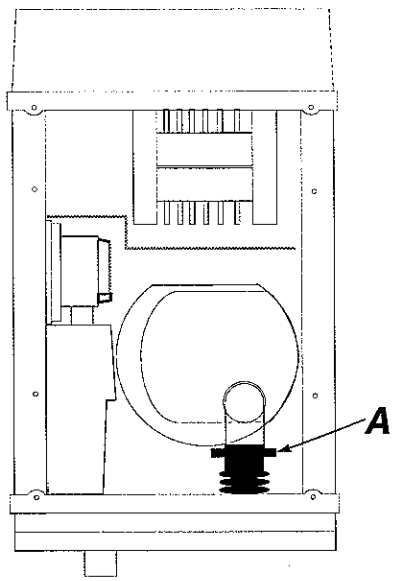


Figure 6-44

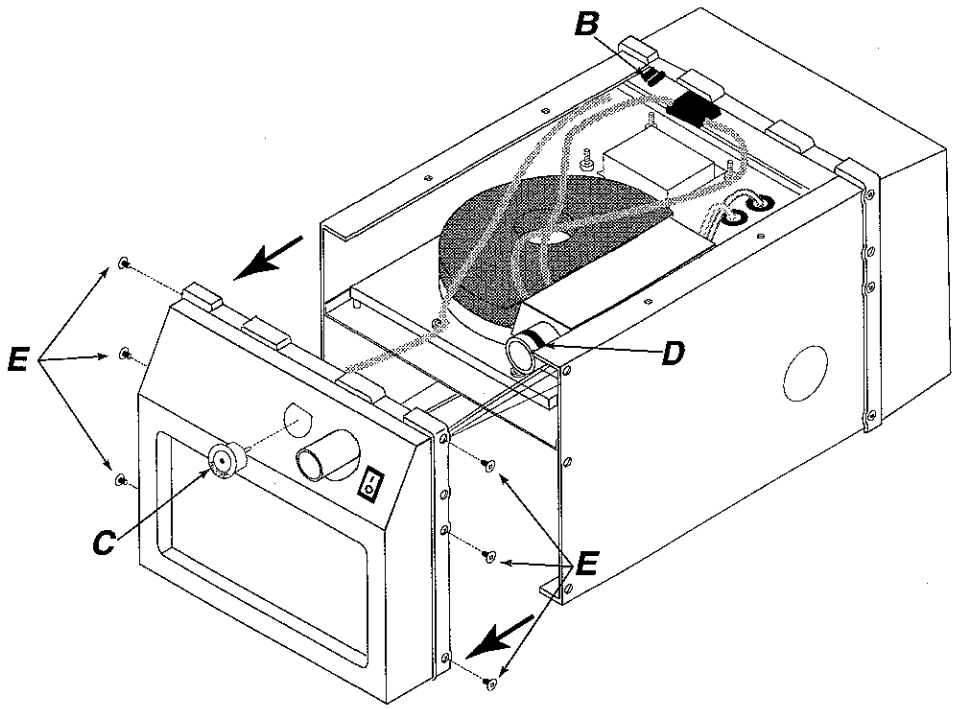


Figure 6-45

Step 3 Place the retaining ring onto the inside of the pressure port. Place a $^{13}/_{16}$" socket over the retaining ring, put pressure on the front of the front end cap, and push the retaining ring until it is against the inside of the front end cap.

Step 4 Place the front end cap into position and insert and tighten to 4 in-lb the six Phillip screws that secure the front end cap to the chassis.

Step 5 Place a new hose clamp over the flexible connector and slide the flexible connector over the blower outlet port. Tighten the hose clamp around the connector and blower outlet port.

Step 6 Push the pressure port tubing over the pressure port and tighten with a tie wrap.

Step 7 Turn the unit upside down. Place a new hose clamp over the bellows and slide the bellows over the blower inlet port. Tighten the hose clamp around the bellows and the inlet port.

Step 8 Turn the unit right side up.

Step 9 Replace the bottom plate, the top plate, and the wraparound.

Step 10 Perform the system adjustment as described in Chapter 7.

6.2.18 Replacing the Transformer Secondary Fuses

Replacement Part Number: 552105

Included in Kit:	Tools Required:
2 5 A Transformer fuses 1 Length of polytetrafloroethylene (pfe) tubing	Phillips screwdriver Torque screwdriver capable of 4 in-lb Wire cutters Soldering iron set at 650 °F

Refer to Figures: 6-46 to 6-47

Removing the Fuses

CAUTION: Electronic components used in this unit are subject to damage by static electricity. Use proper static discharge and grounding precautions when servicing the equipment. Service only at a static-free workstation.

Step 1 Remove the wraparound and bottom plate as described in 6.2.1.

Step 2 Turn the unit upside down.

Step 3 Label and remove the four secondary connectors (A) on the transformer.

Step 4 With a pair of wire cutters, cut the existing fuse leads as close to the transformer lugs as possible (B).

CAUTION: Do not attempt to de-solder the entire fuse leads from the transformer lugs. This could lead to a buildup of heat that could destroy the transformer lead wires.

Replacing the Fuses

Step 5 Cut the pfe tubing in half and slide one piece over each of the new fuses.

Step 6 With a soldering iron set to 650 °F, solder the leads of the new fuses directly over the old leads.

Step 7 Turn the unit right side up.

Step 8 Replace the bottom plate and the wraparound.

Step 9 Perform the system adjustment as described in Chapter 7.

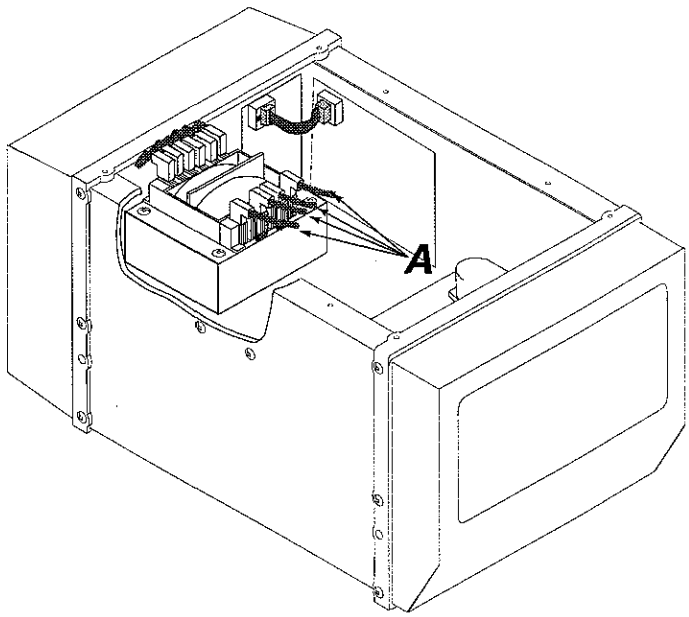


Figure 6-46

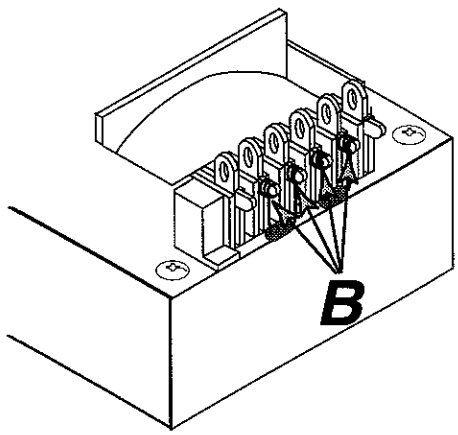


Figure 6-47